The RUBBER AGE

December, 1945

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JAN 1 1946

AGERITE ALBA

in

WHITE *and* BRIGHT COLORED GOODS

From one-half to one per cent of AGERITE ALBA on the rubber hydrocarbon (non-staining type) is beneficial in white and bright colored goods. This benefit is shown by fade-ometer tests and by light exposure tests in Florida.

●

R.T. VANDERBILT CO., Inc.

230 Park Avenue, New York City

Newsletter No. 12
DECEMBER, 1945

Published by Rubber Chemicals Division of DUPONT

RPA No. 5

FOR EFFICIENT BREAKDOWN OF GR-S

WARTIME experience with RPA No. 5 as a plasticizer for GR-S confirmed that it aids materially in reducing breakdown time, thus increasing processing capacity.

RPA No. 5 is a chemical peptizing agent which is added to GR-S during mastication. Some of the desirable effects are:

1. Leveling out of lot-to-lot variations in GR-S.
2. Reduction in breakdown time.
3. Smoother processing.
4. Less heat developed.
5. Broader temperature range of good processing.
6. Lower minimum processing temperature.
7. Better extrusion properties.
8. Faster extrusion.
9. Less swell of extruded stock.
10. No effect on hardness or other properties of cured stock.

IMPROVED EQUIPMENT EFFICIENCY—The immediate practical advantage of plasticizing GR-S with RPA No. 5 is the greatly increased breakdown capacity. In one case plasticator capacity was increased by 83%, and Banbury breakdown capacity 100%.

The effect of RPA No. 5 continues through subsequent operations so that the slightly tougher GR-S from one pass through the plasticator with RPA No. 5 gives as soft, finished stocks as the 2-pass GR-S without RPA No. 5. Lower power consumption and stock temperatures are evident throughout. With the lower temperatures better quality stocks should result.

AMOUNT OF RPA No. 5 TO USE—The proper amount of RPA No. 5 to use depends on such factors as (1) the type of masticating equipment employed, (2) the properties of the particular GR-S in question and (3) the end results desired. For most purposes we suggest the use of the amounts indicated below:

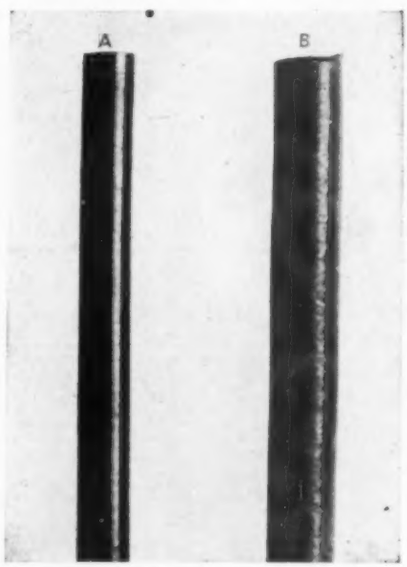
Masticating Equipment	% RPA No. 5 on GR-S
Mill	1.00 — 2%
Banbury	0.50 — 2%
Gordon Plasticator .	0.25 — 1%

EFFECT ON CURE—Experimental data are inconclusive as to the effect of higher quantities of RPA No. 5 on the rate of cure of GR-S stocks. There are indications that stocks accelerated with Thionex, MBT, MBTS or DPG are slightly retarded by 2% of RPA No. 5. With activated accelerators such as SRA No. 2, Zenite B, MBT-DPG and 2MT-Accelerator 808, the vulcanizates have slightly lower modulus, equal tensile strength and higher elongations at break. With 0.5% of RPA No. 5 there is essentially no effect on the physical properties of the cured stock.

HEALTH HAZARDS—Although experience to date indicates that it is much less likely to cause dermatitis than either RPA No. 2 or RPA No. 3, which are widely used in the industry, nevertheless we recommend following the same precautions as with the other RPA's. Workmen should wear long sleeved shirts and gauntlet gloves, and should wash thoroughly any parts of the body exposed to RPA No. 5.

EXTRUSION OF GR-S TREAD STOCK

GR-S Masticated for 20 Minutes at 250° F. 500 Grams Elastomer—8x16 in. Mill



	A	B
Peptizing Agent .	1% RPA No. 5 Liquid	None
Temperature of Extrusion . . .	Low	High
Speed of Extrusion	High	Low
Swell on Extrusion	7%	55%

DUPONT
REG. U.S. PAT. OFF.

RUBBER CHEMICALS DIVISION

BETTER THINGS FOR BETTER LIVING . . . Through Chemistry

THE RUBBER AGE, published monthly by The Palmerton Publishing Co., Inc., Printing Office, East Stroudsburg, Pa. Editorial and Advertising Offices at 250 West 57th Street, New York 19, N. Y. Entered as second class mater October 20, 1933, at the Post Office at East Stroudsburg, Pa., under the Act of March 3, 1879. Subscription in United States, $3.00 a year; Canada, $3.50; Foreign, $4.00. December, 1945, Vol. 58, No. 3.

This ad should fire your customers' enthusiasm for HYCAR

HERE is another in the continuing series of advertisements addressed to *your* customers and prospects in every industry. Each month more than 1,000,000 readers of Newsweek, Business Week, United States News, and a long list of carefully selected business papers are exposed to messages like this, citing spectacular and routine applications for HYCAR, and urging customers and prospects to *ask their suppliers for parts made from HYCAR.*

We encourage these customers and prospects to take advantage of the economical, dependable product performance that they can get from this superior material. That, in turn, makes it possible for you to improve sales quality by selling *up*—instead of merely striving to meet so-called competition.

Outside of providing you with these versatile raw materials and offering laboratory aid in handling difficult applications, this is as far as we can go. We make no finished products.

But we plan to continue this long-range selling program for you and urge that you use it to help sell *quality* parts made from HYCAR. Reprints of all HYCAR advertisements as well as copies of our bulletin, "Everywhere in Industry," are available at no charge for use by your salesmen. Just write *Hycar Chemical Company, Akron 8, Ohio.*

Hycar

Reg. U. S. Pat. Off.

LARGEST PRIVATE PRODUCER OF BUTADIENE TYPE

Synthetic Rubbers

OH BOY!

WHAT A BOUNCING BABY!

And so are your rubber products, when made with Philblack A! They have higher resiliency, less permanent set, and that desirable "rubbery feel."

And there are other advantages that you get when this wonder-working black goes to work for you. Philblack A steps up resistance to abrasion, lowers heat build-up and makes possible easier and faster processing.

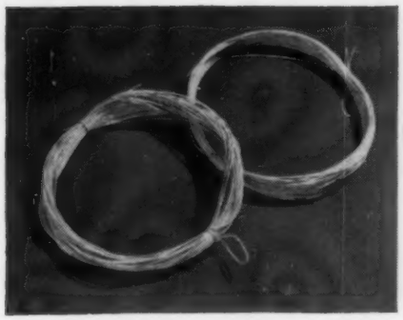
Yes, Philblack A has made life much happier for manufacturers of tires, tubes and other rubber products. Why not put Philblack A to work for you, too?

PHILLIPS PETROLEUM COMPANY

Philblack Division

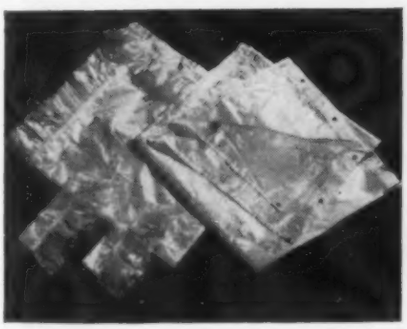
FIRST CENTRAL TOWER BUILDING · AKRON, OHIO

● COATED PAPER



● COATED CORD

● RAINWEAR

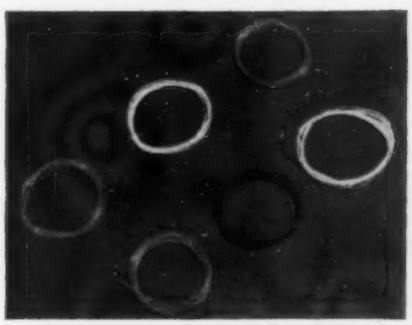


● SHOWER AND WINDOW CURTAINS

● WIRE INSULATION

● COATED FABRIC

These are typical applications for Geon Latex



● COATED SILK AND NYLON THREAD

Water-borne polyvinyl resins provide safer, simpler processing methods

These finished products indicate the variety of articles that can be made using GEON latex as one of the basic raw materials. For example, thin coatings of GEON latex can be applied to fabric, leather, paper, fibre, thread, wire, or any other material to which coatings can be applied by conventional methods.

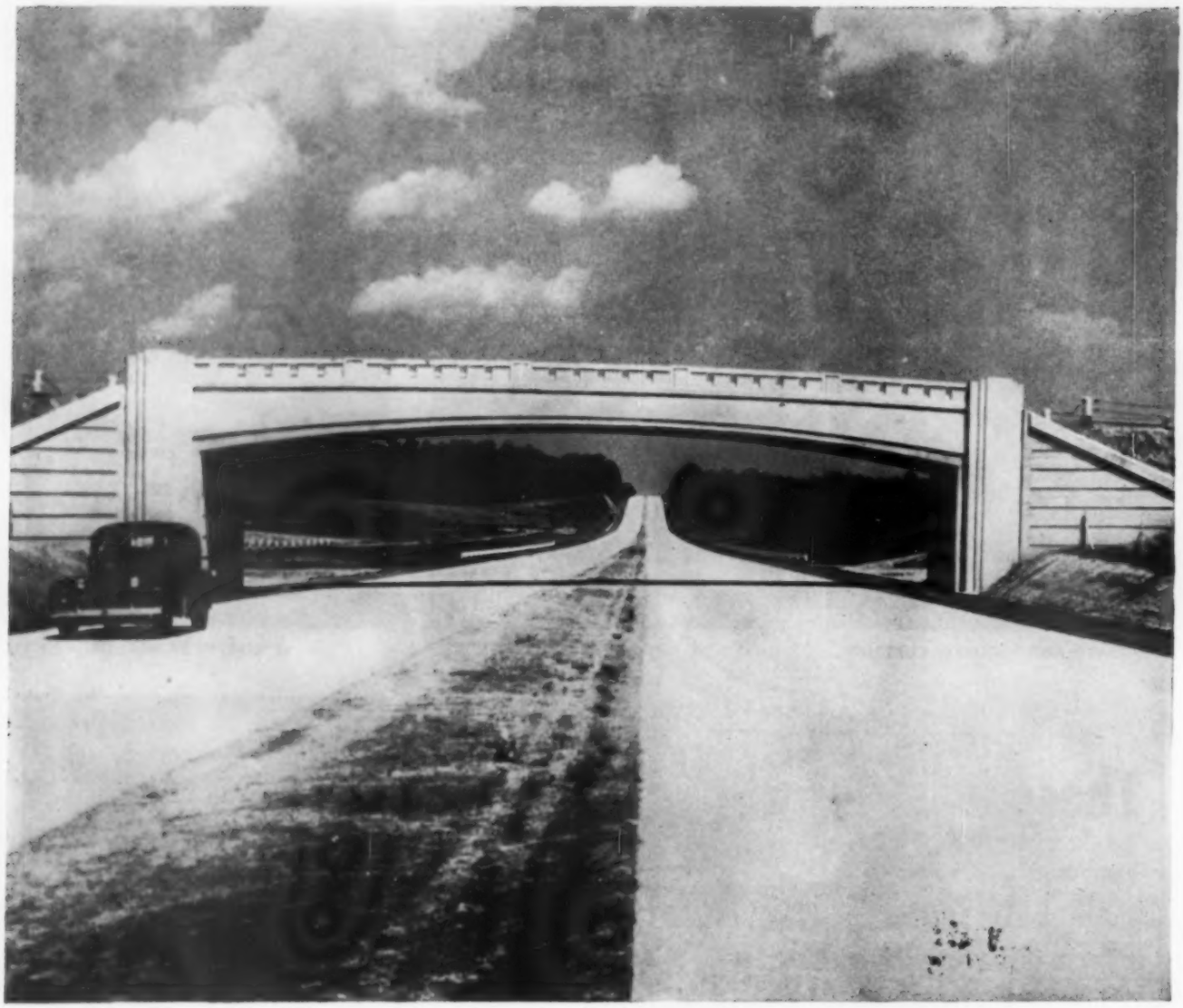
Suitably formulated, GEON latex—a water dispersion containing approximately 50% vinyl resin—can be used on standard processing equipment. Being a water system, GEON latex offers many advantages not to be found in solvent systems—simplicity and economy of processing—no danger of toxic vapors, or explosion—elimination of expensive, cumbersome solvent recovery systems. Highly stable, GEON latex is *not* rubber and contains no rubber.

GEON latex is not a "miracle material" that will do away with other coating methods. Yet already there is evidence that it will open entire new fields in the manufacture of coatings, sheet, and film. For more information write Dept. KK-12, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio.

Geon
Polyvinyl Materials

B. F. Goodrich Chemical Company

A DIVISION OF THE B. F. GOODRICH COMPANY



There'll be some changes made

THE highways of the nation, long nearly empty, are beginning to fill up—and will fill up *fast* as soon as new cars are available in quantity. More than 4,000,000 new cars will be built in 1946, with proud owners raring to go.

Riding with them in these new cars will be an average of 35 pounds of reclaimed rubber—in tires, floor mats, extruded strip, battery cases, and in other forms. That means *70,000 tons* of reclaimed rubber used by just one part of one industry. Much of it will be Philadelphia Reclaimed rubber, a truly *important* material that will never be replaced by natural or synthetic rubbers.

That's because Philadelphia reclaim continues to be the most economical material to use in the manufacture of many rubber parts. It's stable and dependable—easy to use and easy to get results with. Within its field, Philadelphia Rubber can offer the rubber industry economy of manufacture of quality products, a low selling price for the finished product, and a fair margin of profit, even in highly competitive markets.

Philadelphia Rubber's technical staff continues at your service to help you solve any problem having to do with reclaimed rubber—natural or synthetic. The Philadelphia Rubber Works Company, Rose Building, Cleveland 15, Ohio.

PHILADELPHIA
RECLAIMED RUBBER

WILMINGTON

CHEMICAL CORPORATION

10 EAST 40TH STREET • NEW YORK 16, N. Y.

Want to stay in business — profitably?
Want to go into business — profitably?

AMERICAN ANODE

offers a Complete

SURVEY, RESEARCH, AND ENGINEERING SERVICE
for the use of
natural and synthetic ANODE latices and water mixes

New or old product development and research
Pilot plant design and operation
Redesign of old equipment and production methods
Design of new equipment and production methods
Complete research and development laboratory service
Consultant service for all problems relating to coatings, impregnating, cementing
All types of latices available at Akron plant — natural rubber, GR-S, Hycar, Geon, Neoprene.

AMERICAN ANODE *is the only company offering this complete service*

FOR MORE INFORMATION PLEASE WRITE AMERICAN ANODE, INC., 60 CHERRY STREET, AKRON, OHIO

AMERICAN ANODE
INCORPORATED
NATURAL AND SYNTHETIC RUBBER LATICES, WATER CEMENTS AND SUSPENSIONS

Good news for rubber manufacturers—

CHEMIGUM N-3

the easy-processing synthetic rubber

IS NOW AVAILABLE

non-staining
and
non-discoloring

THIS new type of Chemigum N-3 makes Goodyear Chemigum more desirable than ever for many uses—opens new fields to its employment. Chemigum N-3 is more easily processed than other synthetics. It breaks down more uniformly — is heat stable — doesn't harden when mixed at high temperatures.

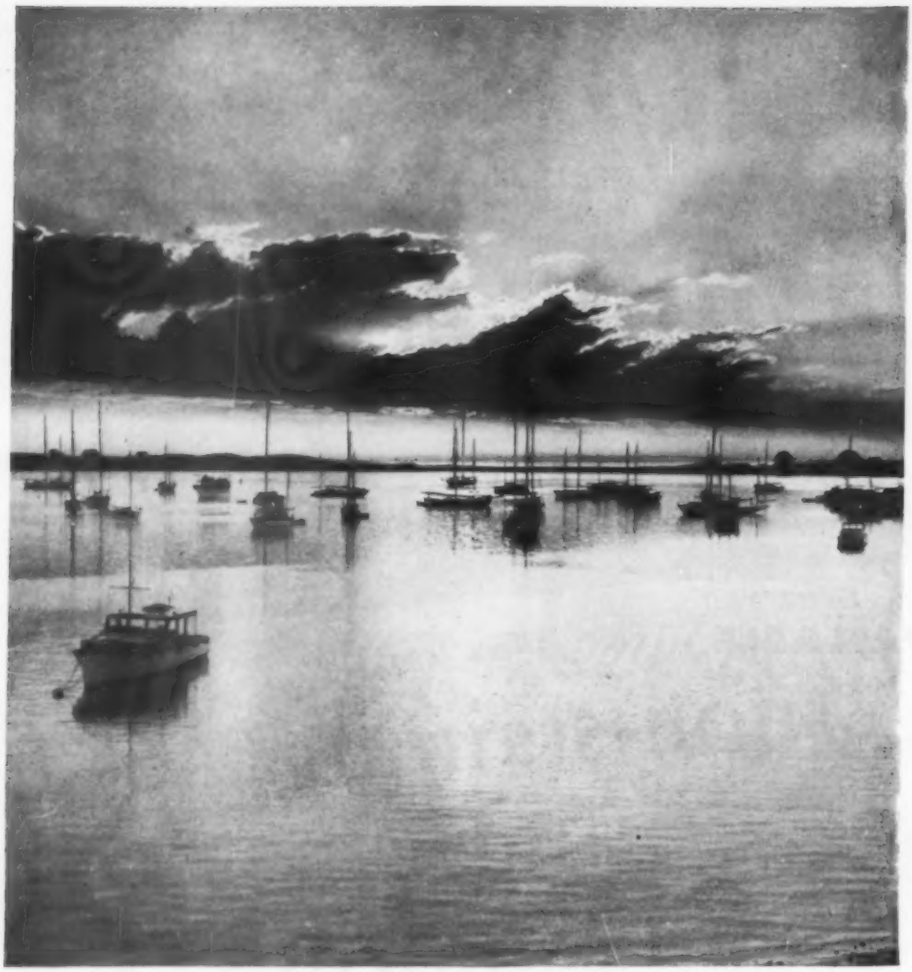
It also has good heat-aging characteristics, low solvent swell, low compression set and high oil-resistance. As a result many processing difficulties are eliminated by using Chemigum N-3, production time is saved and you get uniform quality in your finished products.

Chemigum N-3 can now be supplied in any quantity for volume production. Write for sample and processing data, specifying which type you want. Goodyear, Chemical Products Division, Plastics and Coatings Dept., Akron 16, Ohio.

Chemigum (pronounced Kem-e-gum)—T.M. The Goodyear T. & R. Co.

GOODYEAR

THE GREATEST NAME IN RUBBER



Safe Anchorage

There's a comforting feeling of security in the assurance that when you specify PELLETEX or GASTEX you know you will always get a pure, uniform, and dependable product — exactly what you order to be delivered when you want it. It's like dropping anchor in a quiet harbor after a battle with a stormy sea outside.

GENERAL ATLAS CARBON CO.

PELLETEX

GASTEX

MANUFACTURER

Pampa, Texas

Guymon, Okla.

HERRON BROS. and MEYER

DISTRIBUTOR

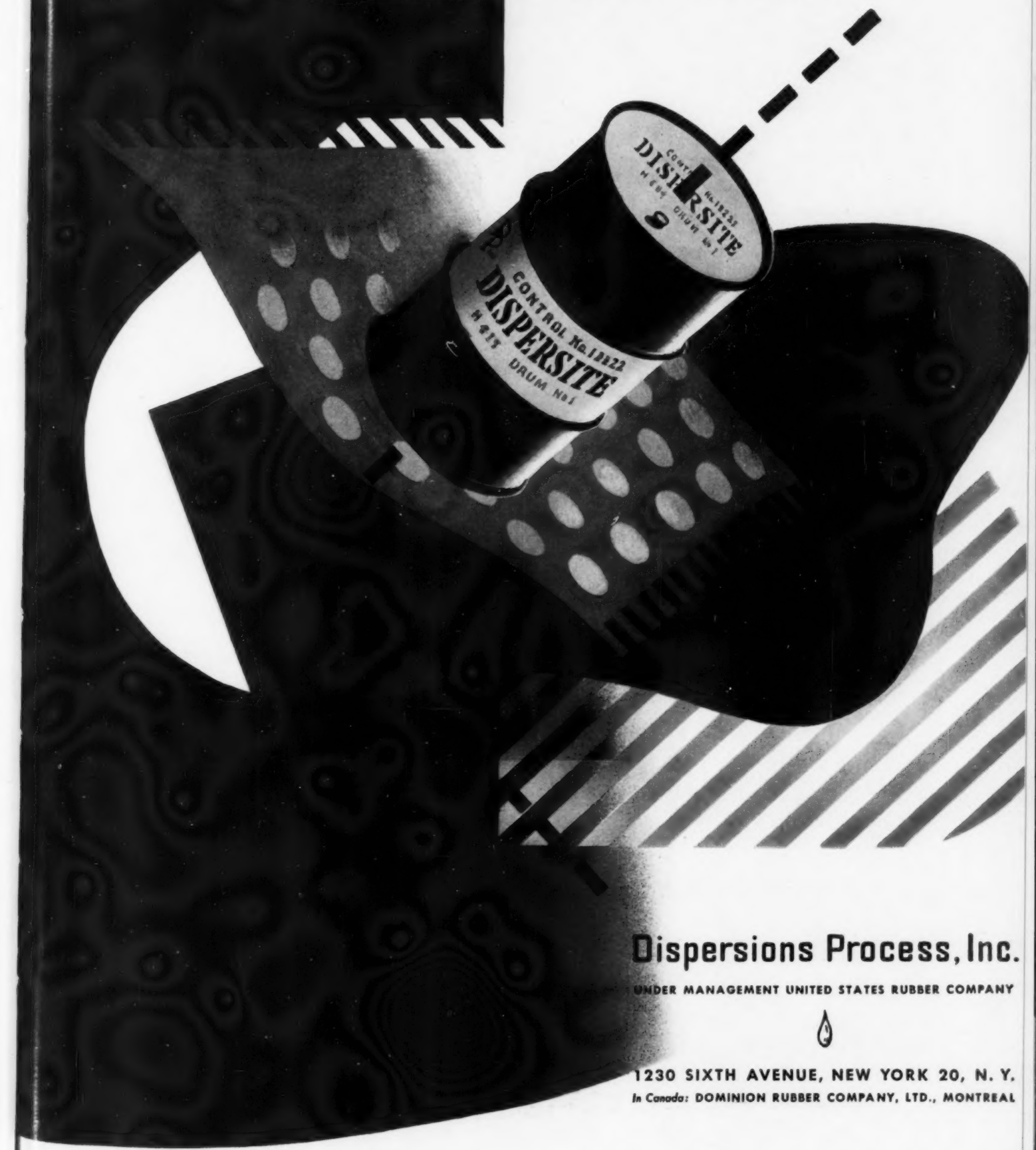
New York, N. Y.

Akron, Ohio

RUBBER H and M PIGMENTS Chemicals

Water Dispersed Rubbers and Resins

for Coating, Saturating and Bonding Fibrous Materials



Dispersions Process, Inc.

UNDER MANAGEMENT UNITED STATES RUBBER COMPANY

1230 SIXTH AVENUE, NEW YORK 20, N. Y.

In Canada: DOMINION RUBBER COMPANY, LTD., MONTREAL

Message to an executive with rubber products to sell

JOHNSON'S RUBBER FINISHES add extra "eye" and "buy" appeal!

Now your new rubber products can be given extra "eye" and "buy" appeal . . . shielded from "shopwear" during production and while on display . . . guarded against scuffs and bumps in transit. Made more impervious to dirt and finger marks, less vulnerable to oxidation and sun-checking, your goods become more salable.

Reason for all these benefits to rubber is Johnson's Rubber Finishes. Secret of their beautifying and protecting powers is wax. Johnson laboratories have made wax the basic ingredient in these finishes that "dress up" a product—give it a lustrous beauty and protection.

Johnson's Rubber Finishes are available in clear and black. They may be easily and economically applied by spraying, dipping, brushing or wiping. Drying time is short. They resist cracking and scaling, are non-flammable.

Johnson's Rubber Finishes *can* give *your* product the "plus" it needs to be a sales leader. For information, fill out and mail the coupon today!

JOHNSON'S RUBBER FINISHES

Made by the makers of Johnson's Wax

S. C. JOHNSON & SON, INC., Racine, Wisconsin

Keep buying more EXTRA War Bonds!

S. C. JOHNSON & SON, INC.
Dept. RA125 Product Finishes Dept., Racine, Wis.

Gentlemen: Yes, I would like to know how Johnson's Rubber Finishes will help sell my products. Please send the "Special Waxes for Industry" brochure.

Name _____ Title _____

Address _____

Company _____

Product _____

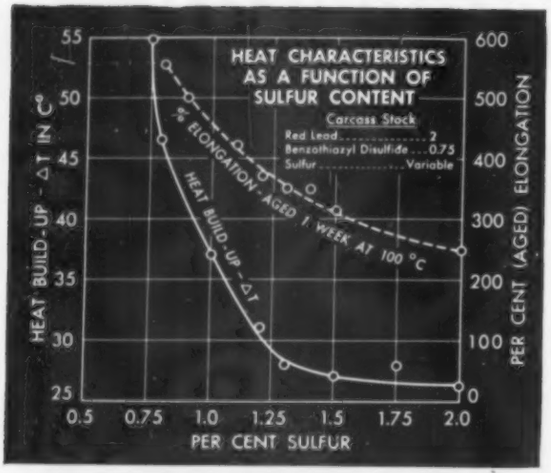
WANT a synthetic that molds with good-looking, rich, smooth sheen? Then specify Butaprene N! Your product will come from the mold with a beautiful, high gloss; practically ready for packing. No lacquer, spraying or polishing is necessary; finishing operations are reduced to a bare minimum.

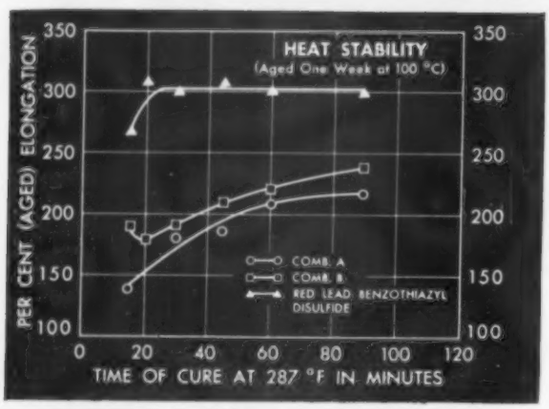
And your product not only looks better with Butaprene N, it *is* better; for perfect moldability is only one of the many desirable properties of these versatile Butaprene polymers. Compression set is unusually low —only 14%*; oil and fuel resistance remarkably high. They function well in blistering heat or sub-zero cold; are ideal for gaskets, sleeves, packings, hose and similar parts operating in gasoline, hydraulic fluids or lubricating oils. For complete chart showing all the properties of the Butaprene N synthetics write XYLOS RUBBER COMPANY, AKRON 1, OHIO.

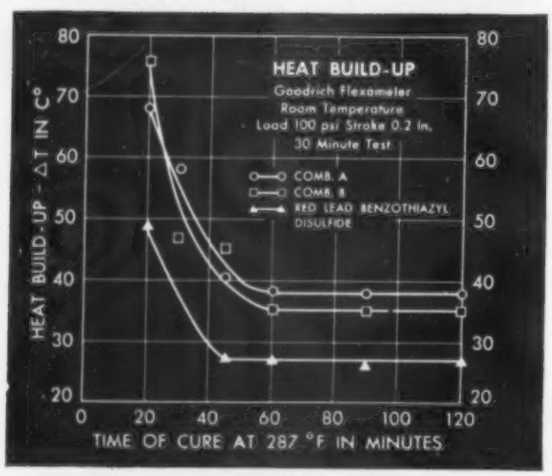
*ASTM Method B; formula on request.

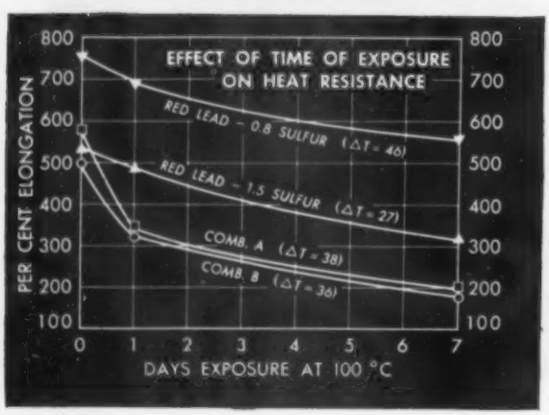
For the best in music listen to the "Voice of Firestone" over N. B. C. Network every Monday evening

Copyright, 1945, The Firestone Tire & Rubber Co.


HEAT CHARACTERISTICS AS A FUNCTION OF SULFUR CONTENT
Carcass Stock
Red Lead 2
Benzothiazyl Disulfide ... 0.75
Sulfur ..... Variable
% ELONGATION - AGED 1 WEEK AT 100 °C
HEAT BUILD-UP - ΔT
HEAT BUILD-UP - ΔT IN C°
PER CENT (AGED) ELONGATION
PER CENT SULFUR


HEAT STABILITY
(Aged One Week at 100 °C)
COMB. A
COMB. B
RED LEAD BENZOTHIAZYL DISULFIDE
PER CENT (AGED) ELONGATION
TIME OF CURE AT 287 °F IN MINUTES




EFFECT OF TIME OF EXPOSURE ON HEAT RESISTANCE
RED LEAD - 0.8 SULFUR (ΔT = 46)
RED LEAD - 1.5 SULFUR (ΔT = 27)
COMB. A (ΔT = 38)
COMB. B (ΔT = 36)
PER CENT ELONGATION
DAYS EXPOSURE AT 100 °C

Heat build-up and heat stability . . . both improve when you compound GR-S with RED LEAD

Have you had difficulty making your GR-S carcass stocks both heat resistant and cool running?

If so, try the right combination of red lead, benzothiazyl disulfide and sulfur.

Its acceleration is sufficiently active and efficient to provide—concurrently—heat stability and low heat build-up.

Note the following table and the accompanying charts.

FORMULA

GR-S (Institute)	100
S.R.F. Black	30
Zinc Oxide	3.0
Paraflux	7.5
No. 2 R.M. Red Lead	2.0
Benzothiazyl Disulfide	0.75
Sulfur	1.5

Physical Properties

T/287° F.	Tensile Strength	% Elong.	T-300	Shore	ΔT* in C°
15	1520	860	315	....	....
20	1630	780	390	46	49
30	1450	630	520	47	47
45	1330	530	570	47	27.5
60	1210	480	520	47	27
90	1130	500	590	47	26
120	1100	500	610	47	28

	Aged One Week at 100° C.			Aged 48 Hours at 100° C.	
T/287° F.	Tensile Strength	% Elong.	T-300	Shore	ΔT* in C°
15	910	270	.....	....	....
20	1080	320	1000	54	30.5
30	990	300	990	54	30.5
45	1050	310	1000	53	29.5
60	1130	300	1090	53	26
90	1090	300	1090	53	25
120	1160	340	1100	53	25

*Goodrich Flexometer operated at room temperature. 30 minute tests. Load 100 psi, stroke 20%.

SUMMARY OF ADVANTAGES

1. Imparts improved heat resistance—retention of elasticity.
2. Imparts improved heat build-up—cooler running.
3. Relatively faster curing rate.
4. Safe processing.
5. Excellent general physical properties.
6. Broad curing plateau—very little change in properties on overcures.
7. Economical.
8. Available.

The charts illustrated are taken from a report on recent experimental work by the Rubber Division of our Research Laboratories on the problem of heat build-up and heat stability in GR-S stocks. Write for your copy. The report is titled, "The Heat Problem in GR-S Carcass Stocks."

NATIONAL LEAD COMPANY New York, Buffalo, Chicago, Cincinnati, Cleveland, St. Louis, San Francisco; Boston (National-Boston Lead Co.); Pittsburgh (National Lead & Oil Co. of Penna.); Philadelphia (John T. Lewis & Bros. Co.).

For the Latex Processor

ACRYSOL GS

A completely synthetic thickener for rubber latices. Provides effective and permanent viscosity increase, particularly with GRS latices.

TRITON R-100

An efficient, low-cost dispersing agent for carbon black, dry pigments and vulcanizing agents.

TRITON N-100

A non-ionic dispersing and stabilizing agent for use with latex. Because it is unaffected by electrolytes, Triton N-100 is very useful in dipping operations.

These three products are among the many developed by Rohm and Haas research to aid in the efficient and economical compounding of natural and synthetic rubber latices.

TRITON *and* ACRYSOL *are trade-marks, Reg. U. S. Pat. Off.*

THE RUBBER CHEMICALS DEPARTMENT

ROHM & HAAS COMPANY

WASHINGTON SQUARE, PHILADELPHIA 5, PA.

Manufacturers of Chemicals for the Rubber, Textile, Leather, Enamelware and other Industries . . . Plastics . . . Synthetic Insecticides . . . Fungicides . . . Enzymes

Now Available.....

GOODRITE ERIE

an outstanding accelerator for low heat build-up in compounding GR-S and natural rubber

VULTROL

for use in synthetic rubber compounding to prevent scorching, and for recovering scorched stocks

For technical data please write

B. F. Goodrich Chemical Company

A DIVISION OF THE B. F. GOODRICH COMPANY

ROSE BUILDING CLEVELAND 15, OHIO

If you add to the native excellence of GN NEOPRENE a light touch of NEOPRENE PEPTIZER P-12, the result—from a processing and stability viewpoint—will be astonishing.

Write us for Technical Information. Or, better yet ask anyone who is using it!

•

THE CALDWELL COMPANY

2412 First Central Tower

Akron 8, Ohio

Neoprene Peptizer P-12—Trade Mark Registered—Patent Applied For

This month we're telling **39,477,228** people about

RAYON CORD TIRES!

A new chapter in the history of tires

Out of the laboratory test tube, through the fury of war, RAYON CORD takes its place at the head of the list of revolutionary advances in tire-making.

* * *

Rayon tires kept our Armies rolling on to Victory—saved many a G.I.'s life on the far-flung battlefields of the world. Soon you'll be rolling on rayon too—and what an experience you have in store. Tire makers say that never will you have ridden so safely, never so comfortably, never will you have enjoyed so much trouble-free mileage.

From Fashions to Fighting—Maybe you know how rayon, long in the forefront of the fashion picture, went to war. Exhaustive tests and wartime performance definitely proved rayon superior, whether used with synthetic rubber, natural rubber, or combinations of both.

Why Rayon Cord Tires are Better—Because rayon production is entirely within human control, and is not subject to fickle Nature, it can be given properties of strength and uniformity only possible through scientific production. Here are some of the advantages you can look forward to in tires of rayon:

GREATER SAFETY—Heat is the enemy of tires. Because rayon cord tires run cooler, and the cord actually gets stronger as their temperature rises, road failure is greatly reduced. Reports from the Army and bus and truck fleet operators show there are fewer blowouts and road failures when they use rayon cord tires.

MORE COMFORT—Because rayon cord has greater strength per unit of weight, tires of rayon can be lighter, requiring less rubber and cord. And tire men will tell you a lighter tire flexes easier, has less rolling resistance, and altogether, gives you a more comfortable ride.

LONGER LIFE—With heat breakdown reduced, rayon cord tires will give you greater mileage. How much greater depends on car, driver, roads but, truth be told, you'll probably be riding on the same set of rayon cord tires as long as you keep your car.

Industrial Rayon's TYRON—A leader in the manufacture of rayon for tires, Industrial Rayon is proud of its major contributions to this important developement. Our Tyron, a rayon cord of war-tested excellence, is produced by an exclusive Continuous Process to provide the ultimate in uniformity. To tire manufacturers this is an ideal—a cord that is uniform today, tomorrow, next year—spool after spool, and hence tire after tire.

Industrial
RAYON CORPORATION
Cleveland, Ohio
makers of TYRON and Spun 6 rayon

SMASHING full-page messages are running in the

Saturday Evening Post **Colliers**
Look **Liberty** **American Weekly**
American Magazine **Fortune**

and in large space ads in more than 100 newspapers in major cities from coast to coast, to tell the story of this modern miracle, the rayon cord tire.

As producers of Tyron rayon tire cord, Industrial Rayon is proud to have played so important a part in the development of high-strength rayon—and pleased to tell Americans about these new, safer, better, longer-wearing tires of their motoring future.

TYRON *Reg. U. S. Pat. Off.

rayon for tires

Made by INDUSTRIAL RAYON CORPORATION
Cleveland, Ohio

Quick data on Dipex*

- Successful anti-stick molding agent for natural, synthetic and reclaimed rubber.
- Freely soluble in water—can be applied in dilute solution by spraying, dipping, or brushing.
- Extremely light in color—gives clean, sharp designs without staining when applied to molds for white goods.
- Free from deposit-forming constituents.

Complete data and free samples on request.

*Reg. U. S. Pat. Off.

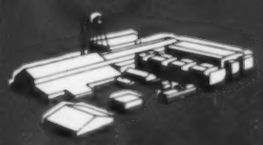
Stanco Incorporated
216 WEST 14TH STREET, NEW YORK 11, N. Y.

Copr. 1945, Stanco Incorporated

UNITED

in Research · Engineering · Production

2 GREAT ORGANIZATIONS · 6 GREAT PLANTS



PITTSBURGH

VANDERGRIFT

NEW CASTLE

YOUNGSTOWN

CANTON

AKRON

Serving the Metal Processing Industry

UNITED ENGINEERING AND FOUNDRY CO.

The World's Largest Designers and Makers of Rolls and Rolling Mill Equipment

TYPICAL PRODUCTS MANUFACTURED BY UNITED

ROLLING MILLS

Blooming · Slabbing · Plate · Universal 2, 3, 4-high · 4-high Hot Strip · Bar Rail and Structural · Merchant Rod · Sheet · Skelp · Pipe and Tube · 2 and 4-high Cold Strip · Tin · Unitemper

In all types: Single Stand, One Way or Reversing, Tandem, Continuous, etc. For Carbon Steel, Alloy Steels, Copper, Brass, Aluminum and other Non-Ferrous Metals.

ROLLS

"UNEFCO" Green Wabblers, Grain and Chill · United Nickel Chill · United Moly. Chill · United Spec. Process · UX Chill and Grain · H.D. Spec. Process · Lincoln Special · United Unidense · United Special Steel · United Carbon Steel · United Adamite · United VAN-X · United Super X · United Straight Chill.

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Ingot Cars
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Rod Reels
Hot Strip Reels
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Shearing Lines
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UNIDRAW—Continuous Draw Benches
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Serving the Rubber, Plastics and Plywood Industries

ADAMSON UNITED COMPANY *

Subsidiary of United Engineering & Foundry Co.

TYPICAL PRODUCTS MANUFACTURED BY ADAMSON UNITED

Mills
Refiners
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Belt Curing Presses
Compression Molding Presses
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Auxiliary Equipment

*Formerly ADAMSON MACHINE CO., Akron, Ohio

Recent acquisition, by UNITED ENGINEERING and FOUNDRY COMPANY, of ADAMSON UNITED COMPANY, combines the experience and capacities of two great research, engineering, and manufacturing organizations in a wide field of service to processors of metals, rubber, plastics and plywood.

The *united* resources and abilities of these two internationally known companies, both leaders in their respective fields for over 50 years, offer unusual advantages to industries interested in the development of new processes and equipment for present or postwar expansion.

We invite you to consult us while your plans are still in the blueprint stage.

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PITTSBURGH, PENNSYLVANIA

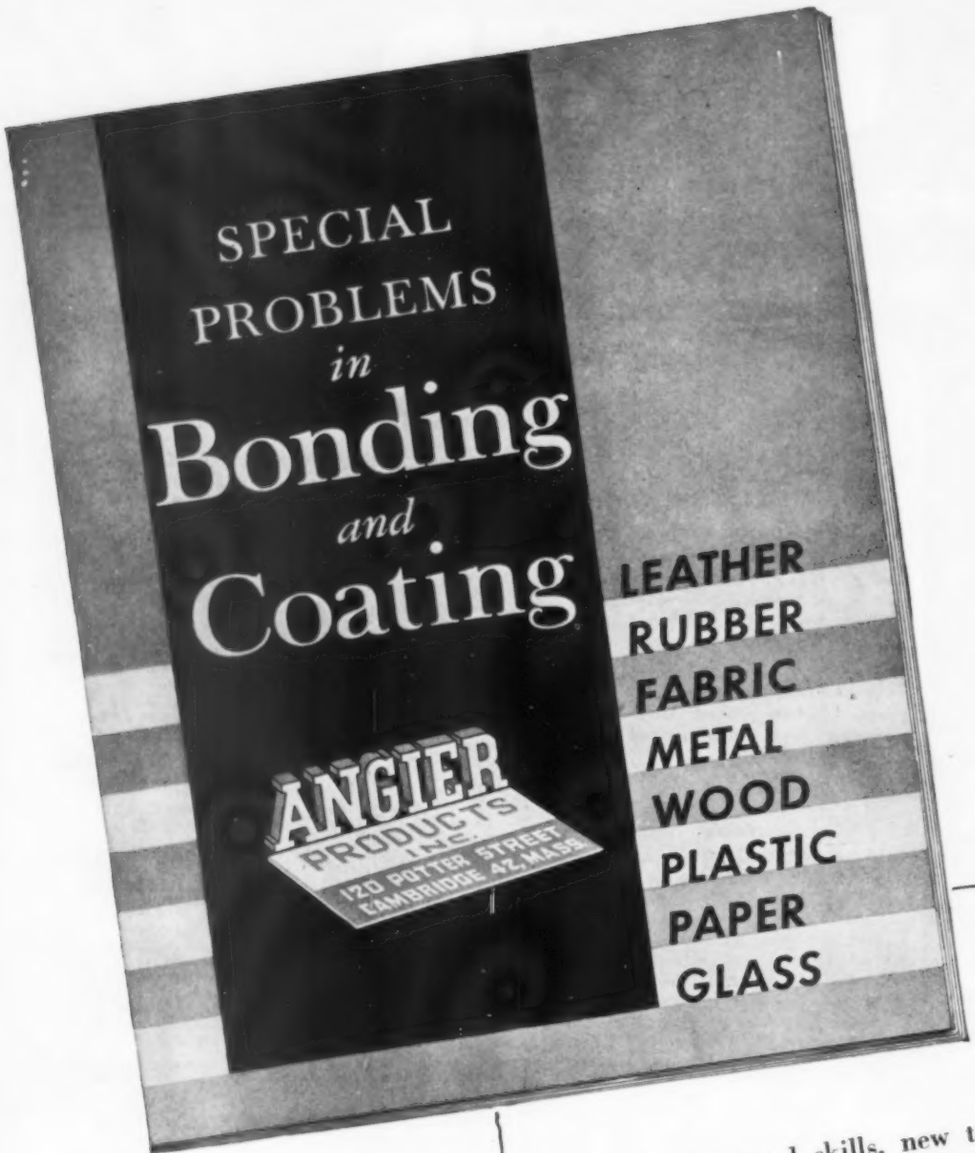
Plants at Pittsburgh · Vandergrift · New Castle · Youngstown · Canton

Subsidiary: Adamson United Company, Akron, Ohio

Affiliates: Davy and United Engineering Company, Ltd., Sheffield, England

Dominion Engineering Works, Ltd., Montreal, P. Q. Canada

The World's Largest Designers and Makers of Rolls and Rolling Mill Equipment



War-learned skills, new techniques and the multiplication of uses for adhesives, cements, coatings and laminants are the theme of this illustrated brochure. It will suggest to you how the long experience and the laboratory and manufacturing facilities of Angier Products, Inc. can be put to work for you in solving today's pressing production problems. A request on your letterhead will bring a copy of this brochure to your desk.

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CAMBRIDGE 42, MASS.

GOOD PROCESSING IN YOUR PLANT STARTS IN OUR LABORATORY

Goodrich INSTALLS PC FOAMGLAS INSULATION

In the Goodrich plant at Akron, Ohio, high humidities and high temperatures created a condensation problem in the mold shop. PC Foamglas was installed right over the existing roofing because of its proven ability to control this condition. Contractor—Akers and Harpman, Akron, Ohio.

THE insulating properties of PC Foamglas are *permanent*. While many other materials deteriorate with age, PC Foamglas goes on year after year without loss of its original insulation value. Being glass, it is impervious to moisture, vapors and the fumes of most acids. It is verminproof, fireproof.

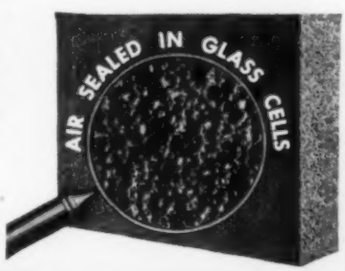
On roofs and equipment, in floors and walls, PC Foamglas helps to maintain predetermined temperature and humidity levels. It lessens the possibility of condensation. Can you think of any other insulation that does all these things—permanently?

In all sorts of plants, all over the country, PC Foamglas is in increasing demand among men who are facing insulating problems. Freedom from repairs and replacement alone is prime proof of its ability to keep insulation costs down to rock bottom.

When you are considering insulation, be sure to check other materials against PC Foamglas. For complete information, just fill in and mail the convenient coupon. We shall be glad to forward free copies of the booklets you select. Room 812, Pittsburgh Corning Corporation, 632 Duquesne Way, Pittsburgh 22, Pennsylvania.

· *Also makers of PC Glass Blocks* ·

YOU DON'T have to figure on repairs or replacement when you insulate your roof with PC Foamglas, for it lasts as long as the building on which it is installed. Even a break in the roofing felt that exposes the insulation to rain or melting snow will not cause PC Foamglas to flake, crack, rot, check, warp, swell or shrink. In addition, it forms such a firm, even base for roofing felt that such breaks rarely if ever occur.



PC FOAMGLAS *Waterproof Fireproof* **INSULATION**

T. M. REG. U. S. PAT. OFF.

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Room 812, 632 Duquesne Way
Pittsburgh 22, Pa.

Please send along my *free* copies of the booklets I have checked. It is understood that I incur no obligation.

Roofs_____ Walls_____ Floors_____

*Name*_____

*Address*_____

*City*_____ *State*_____

GREATER SAFETY

ARMY proving ground tests drove home the fact that rayon cord tires were ideally suited to wartime duties.

Heat of sustained operation, cutting, bruising are among the chief causes of dangerous tire failures . . . greatest enemies of safety. And though the Army tests may not apply to your exact operating conditions, they indicate that rayon cord tires will increase tire safety for you.

Rayon has superior tensile strength. Like spring steel it can withstand an almost infinite amount of flexing. It remains strong in spite of tire heat. And the thinner sidewalls that rayon makes possible reduce friction heat at high running speeds. In tires of equal thickness rayon runs cooler by as much as 10°F.

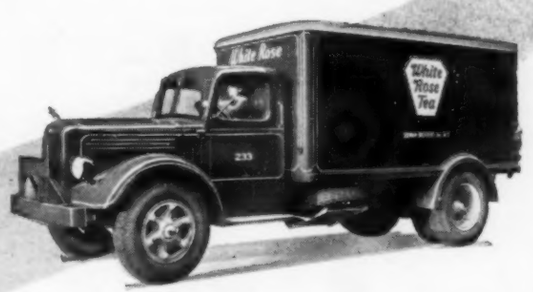
Greater safety follows from fewer blowouts, bruises, cuts, abrasions, and sidewall breaks. Additional advantages of rayon cord tires are longer life, lower operating costs, fewer delays, better mileage, and higher profits for you.

Source of data: Hearings before a Special Committee Investigating the National Defense Program, United States Senate—Seventy-eighth Congress, First and Second Sessions.

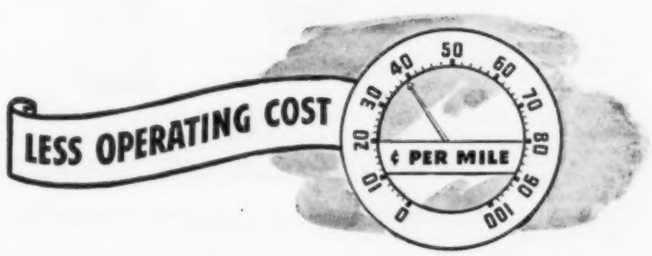
with Rayon Cord

"RAYON CORD TIRES GIVE MORE STOP-START MILEAGE"... *Seeman Bros., Inc.*

George L. Varjan, superintendent of this large private fleet, reports: "Rayon cord tires give us about 10% more mileage on stop-start operations, and about 25% more on over-the-road hauls. The carcass takes more recaps, and will run at higher speeds and loads without sacrificing safety. Our blowout record is also better with rayon."



Less friction heat, higher tensile strength and greater uniformity of rayon tire cords mean more safety at high running speeds.



Rayon cord tires give longer life, greater mileage . . . reduce impact failures, road delays, tire renewals.

AMERICAN VISCOSE CORPORATION

America's largest producer of rayon tire cord, yarn and staple fiber

Offices: 350 Fifth Avenue, New York 1, N. Y.; Charlotte, N. C.; Philadelphia, Pa.; Providence, R. I.; Washington, D. C.; Wilmington, Del.

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As specialists in SCRAP RUBBER we have served the reclaiming industry since its inception, our long experience and expert attention insuring scrap that always comes up to specifications.

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188 W. RANDOLPH STREET
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159 CLEWELL STREET
AKRON 5, OHIO

Cable Address: "Gyblowell"

This illustration, taken from Bulletin 175, shows two tread sections extruded from the same stock. Note that sample A, extruded from an F-B *Roller-Feed* machine, is very dense and uniform, while sample B produced by another type tuber, is porous.

16 pages about better lower cost extrusion

Here is a booklet that deserves the attention of everyone interested in lower-cost extrusion and improved quality of product. It is a new bulletin we have prepared to give you the complete story of better, faster production possible with the Farrel Roller-Feed *Tubing and Straining machine.*

The bulletin explains the operation of the *Roller-Feed*, an exclusive feature that automatically feeds an unvarying supply of stock to the screw. This method of constant, uniform feeding results in the following advantages of "dollars and cents" importance to you:

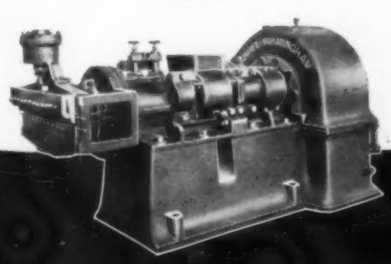
1. **INCREASED OUTPUT**—Increased production rates, ranging from 10% to 25% over machines of conventional design.
2. **IMPROVED QUALITY**—Crowding action of the *Roller-Feed* eliminates trapped air and keeps a constant amount of stock in the extrusion chamber. This assures an extruded section of greater density and uniformity than is otherwise possible. (See illustrations at left.)
3. **LESS SKILL REQUIRED FOR BEST RESULTS**—The *Roller-Feed* is well adapted to strip feeding and has a special advantage when the machine is hand fed. Since correct stock pressure in the screw is maintained automatically, the uniformity of density and gauge is not dependent upon the operator.
4. **GREATER OPERATING SAFETY**—The operator does not risk fingers or hand by manually starting the stock into the screw. The strip is fed in automatically by the *Roller-Feed*.

For complete information on this high-speed, low-temperature production unit, send for your FREE copy of Bulletin No. 175 today.

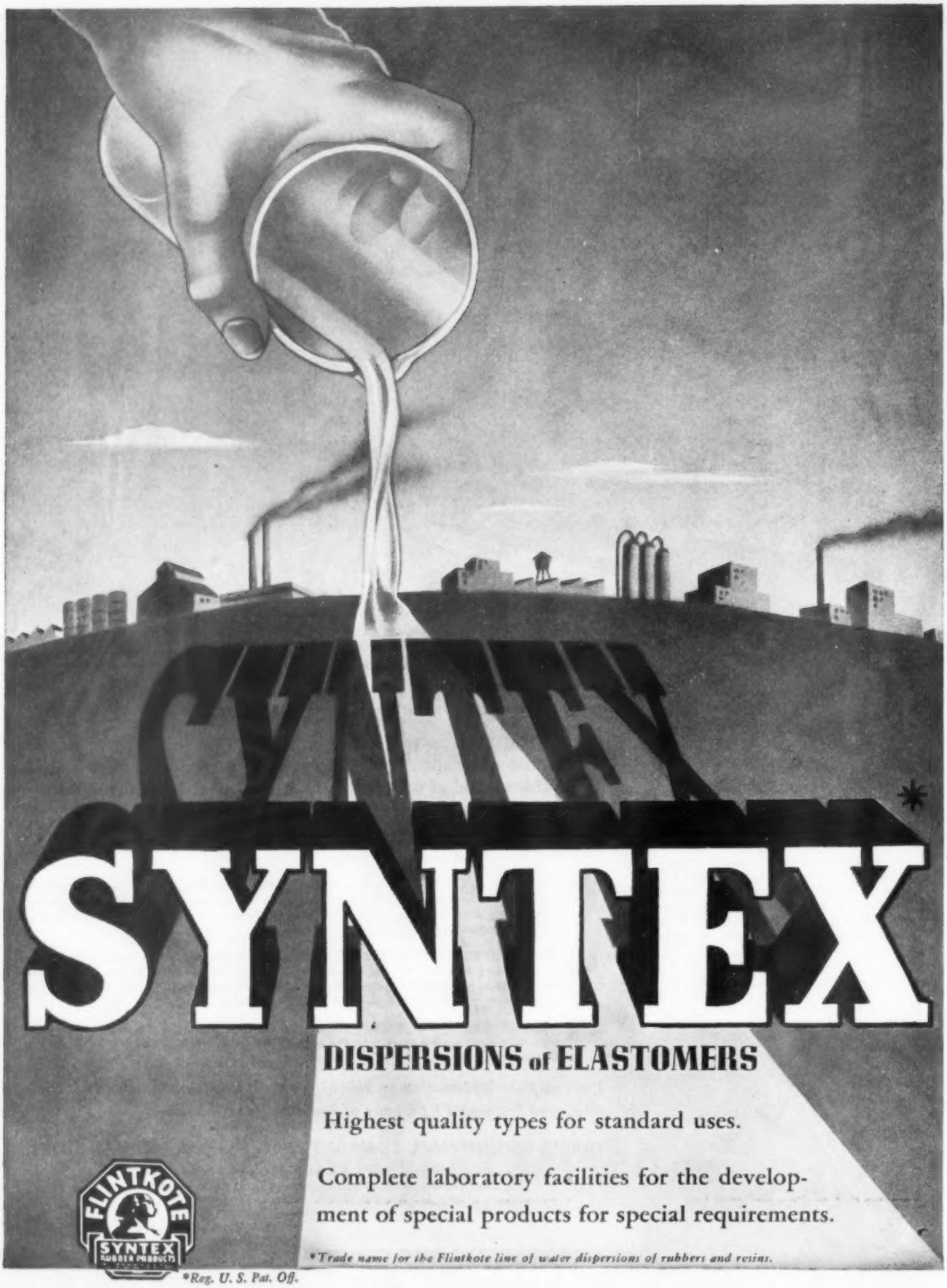
FARREL-BIRMINGHAM COMPANY, INC. • ANSONIA, CONN.

Plants: Ansonia, Derby and Stonington, Conn., Buffalo, N. Y.
Sales Offices: Ansonia, Buffalo, New York, Pittsburgh, Akron, Los Angeles, Tulsa, Houston, Charlotte

FB-264



Farrel-Birmingham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Complete laboratory facilities for the development of special products for special requirements.
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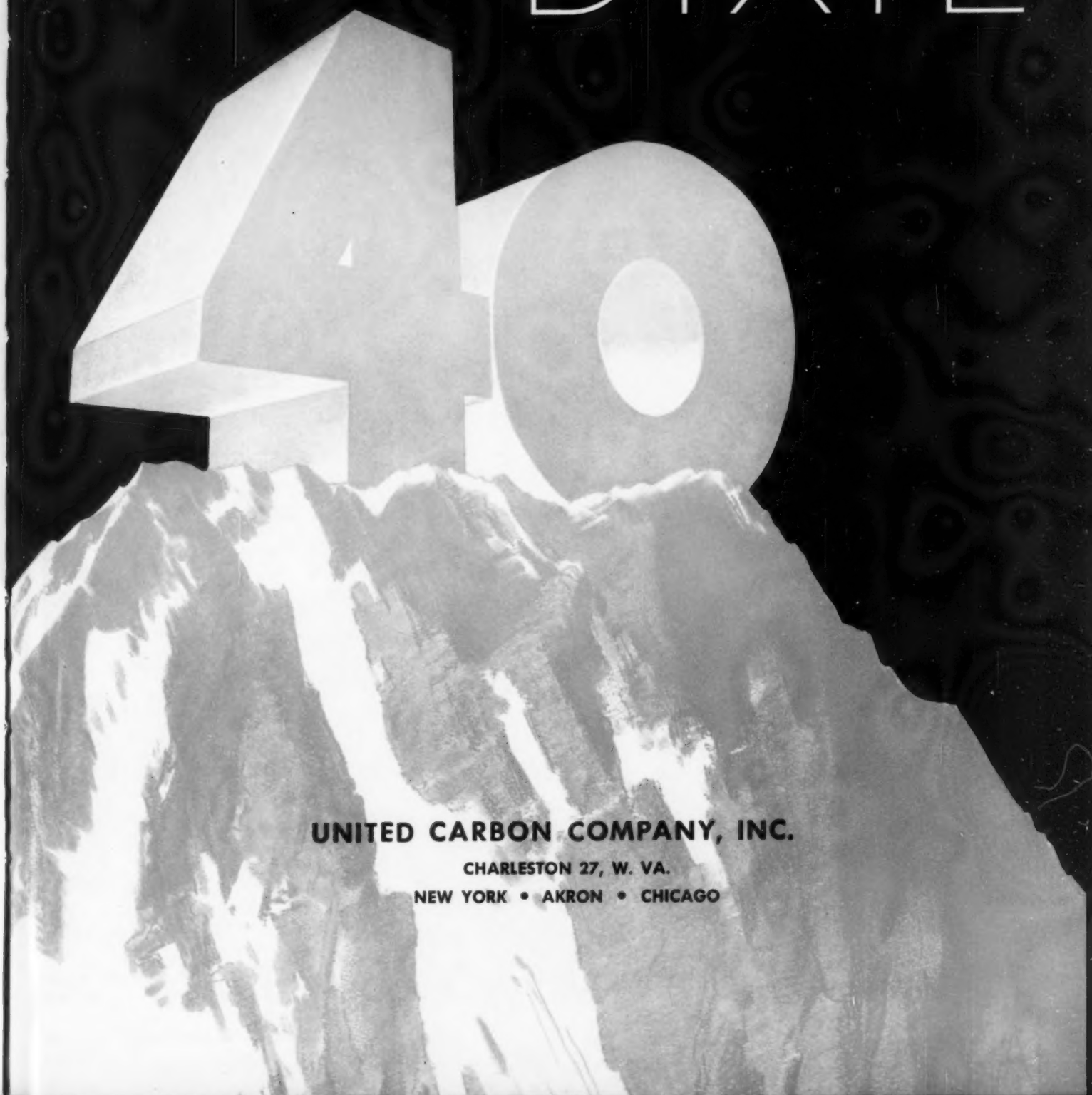

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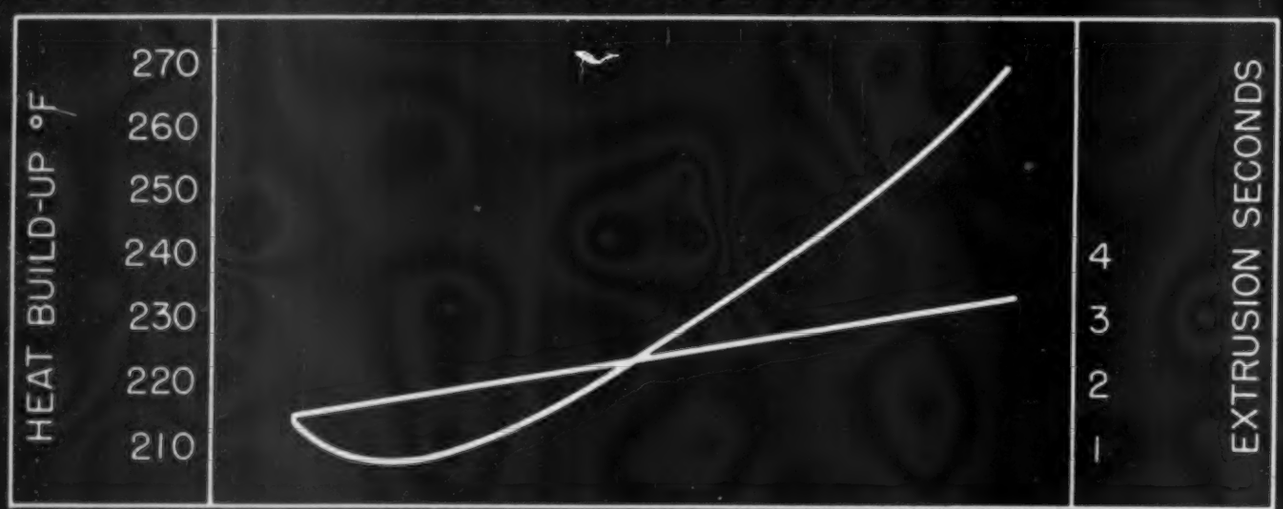
KOSMOS 40 · DIXIE 40

HMF TYPE

HIGH MODULUS FURNACE DUSTLESS BLACK

LOADINGS 0 10 20 30 40 50 60 70 80 90 100



RESEARCH DIVISION

UNITED CARBON COMPANY, INC.

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AN OLD-FASHIONED PORTRAIT COMES TO LIFE

It has been a memory — a happy memory to millions of motorists. It was a beauty as they remembered it, worthy of admiration for its handsome appearance and fine, serviceable life. . . A cherished picture, yes; but it is coming back to reality. With the release of butyl rubber soon and the availability NOW of SILENE EF a *better* inner tube will be the order of the day. SILENE EF makes that *better* tube possible. It assures success in color compounding for *red* tubes. . . SILENE EF is essential in non-black butyl tube compounds to give them the processing qualities, and the good cured physical properties unobtainable when clays or whitings are used alone as the principal loading pigment.

SILENE EF

STANDARD *Chemical Company*

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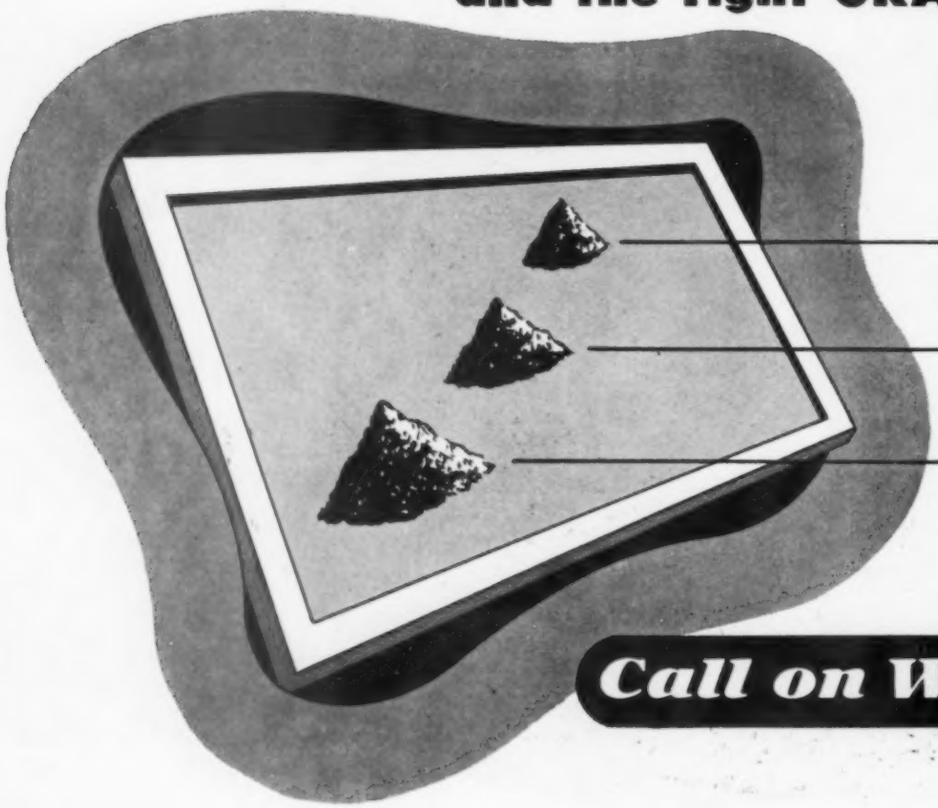
For the right KIND

and the right GRADE



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WHITTAKER invites the challenge of your most exacting requirements—not only as to *kinds* of minerals, colors and pigments, but also as to *grades.* Density, color fineness and chemical properties vary widely in many materials, from grade to grade. WHITTAKER'S stocks of *all* grades are unusually complete. WHITTAKER grinding, research and laboratory facilities are equipped to *match* the characteristics of ingredient and process materials you have used in the past, or to suggest grades still better suited to your specific needs. For the right grade—and the broadest choice of grades—make it a policy to "call on WHITTAKER". Users of minerals, colors and pigments in every field have been doing it for over fifty years. All WHITTAKER products, of course, are laboratory-controlled for density, quality, color.

A Few of the GRADES of a few WHITTAKER PRODUCTS

TALC—all grades; imported and domestic

STEARATES—high and low gel, aluminum, calcium, magnesium, zinc

MAGNESIUM CARBONATE—heavy and light, U.S.P. and Tech.

PUMICE STONE—powdered, granular, lump; American

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TORONTO, CANADA
(Eastern Canada)

To the Country for Christmas, 1920

By 1920 the jingle of sleighbells had begun to give way to the clank of tire chains on country roads and city streets as more and more people, anxious to "get there" in winter as well as summer, kept the family car out of storage and on the go all year 'round.

Here was perhaps the greatest test that tires had ever been called upon to meet. Cold weather, icy ruts and the wear and tear of chains reduced their mileage and increased the risk of blowouts. The rubber industry met the challenge with better tire construction and the increasing use of carbon black, that magic rubber reinforcing material. For carbon black has proved a key material with which tire makers have increased wear resistance—until by 1941 mileages of 35,000 or more were taken for granted!

Witco Chemical Company, founded in 1920, early recognized the vital importance of carbon black to the future development of the rubber industry... went into its production on a large scale... and has worked constantly to improve its effectiveness through research on better production methods. Today Witco blacks are helping to lengthen the service of all types of synthetic rubber products in all climates—from tropic heat to arctic cold. They are among the vital materials that have aided in making our great synthetic rubber program a smashing success.

Today, Witco offers a complete line of carbon blacks not only for rubber compounding but for use in paints, printing inks, paper, plastics and other industries. It is an important part of Witco's increasingly broadening service to America's process industries.

WITCO CHEMICAL COMPANY MANUFACTURERS AND EXPORTERS

[Formerly Wishnick-Tumpeer, Inc.]

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The C. P. Hall Co.
CHEMICAL MANUFACTURERS

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A Complete Line of Approved Compounding Materials

AKRON, OHIO • LOS ANGELES, CALIF. • CHICAGO, ILL.

FROM THE CATALOG OF BARRETT

RUBBER COMPOUNDING MATERIALS . . .

B.R.V.*

B.R.V. is the highest boiling of any of the liquid softeners produced by Barrett from coal-tar oil for the rubber industry.

Specific Gravity	1.14 to 1.18 at 25°C/25°C
Specific Viscosity, Engler, 50 ml. at 50°C	5.0 to 10.0
Insoluble in Benzene, % by weight	0.5 maximum
Water, % by volume	0.5 maximum
Distillation, % by weight	
To 300°C	7.0 maximum
To 315°C	3.0 to 12.0
To 355°C	28.0 maximum

B.R.V. is particularly recommended for use in

GR-S — Reclaiming

GR-A

Availability

Tank cars and 50-55 gallon non-returnable steel barrels

*Reg. U. S. Pat. Off.

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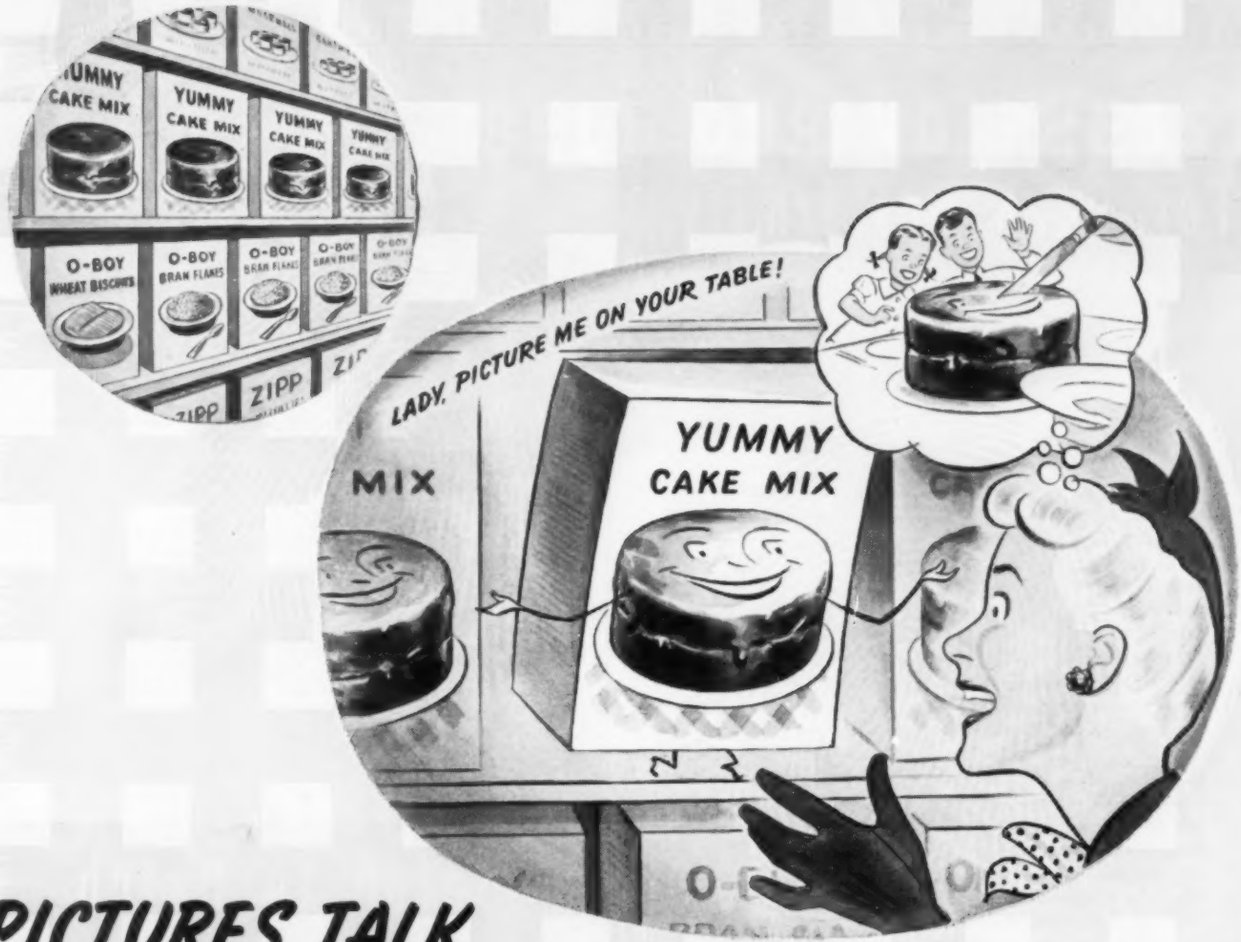


PICTURES TALK

...on Coated Lithwite Cartons!

THEY COME UP WITH SHARPER REALISM—GIVE PACKAGES A MORE PERSUASIVE POWER THAT SELLS MORE GOODS

WIDE-AWAKE EDITORS know it. Smart advertisers know it. Canny merchandisers know it, too. *Pictures get more attention, get ideas over faster than type or abstract designs.* And pictures on *Coated* Lithwite cartons really pack a wallop!

At the point of display—the most vital link in your sales chain—they speak right up and sell. For smooth, velvety *Coated* Lithwite cartons are made of a revolutionary paperboard that reproduces pictures with brilliant and persuasive realism. And these crisper cartons have a quality look and feel that subtly influences shoppers.

When can you get *Coated* Lithwite cartons?

Sorry we can't give you a definite answer. Right now the Gardner-Richardson carton plants can't begin to meet immediate demands. But here's a suggestion: discuss the matter of future Coated Lithwite carton deliveries with a Gardner-Richardson sales representative, now.

Note These Outstanding Coated Lithwite Advantages

1. **Made by a revolutionary process.** *Coated* Lithwite is the brighter, whiter paperboard that is formed, made and coated in one high-speed operation. Proved and improved for six years.
2. **Means more eye-appealing cartons.** *Coated* Lithwite has a smooth, rub-resistant, chalk-free surface. Forms a better base for printing inks and plates—reproduces even the smallest type cleanly, crisply. Brings colors up brilliantly—gives halftones a sharp realism.
3. **Fewer jammers and leakers.** *Coated* Lithwite scores without flaking or shattering. Takes a positive, tight seal.

The GARDNER-RICHARDSON Co.

Manufacturers of Folding Cartons and Boxboard

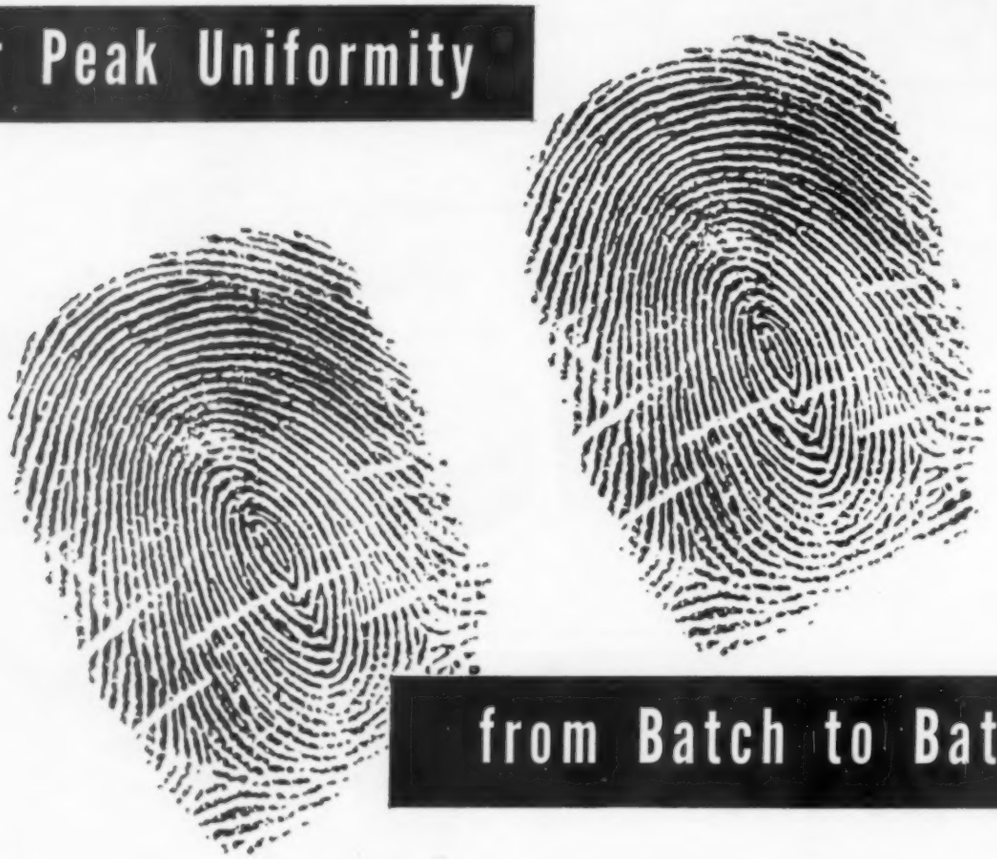
MIDDLETOWN, OHIO

Sales Representatives in Principal Cities: PHILADELPHIA • CLEVELAND • CHICAGO • ST. LOUIS • NEW YORK • BOSTON • PITTSBURGH • DETROIT

WORLD'S LARGEST PRODUCER OF SYNTHETIC RESINS

RCI

For Peak Uniformity



from Batch to Batch

RCI DIBUTYL PHTHALATE

For uniformity of end products you need uniform ingredients—and that's exactly what you get when you utilize RCI Dibutyl Phthalate for plasticizing Vinyl, Neoprene and Buna N synthetic rubbers. *Its quality is constant because RCI's system of production control tolerates nothing less.* Write to the Sales Department for further data on this thoroughly dependable controlled-quality plasticizer.

ARMY E NAVY

REICHHOLD CHEMICALS, INC.

General Offices and Main Plant, Detroit 20, Michigan

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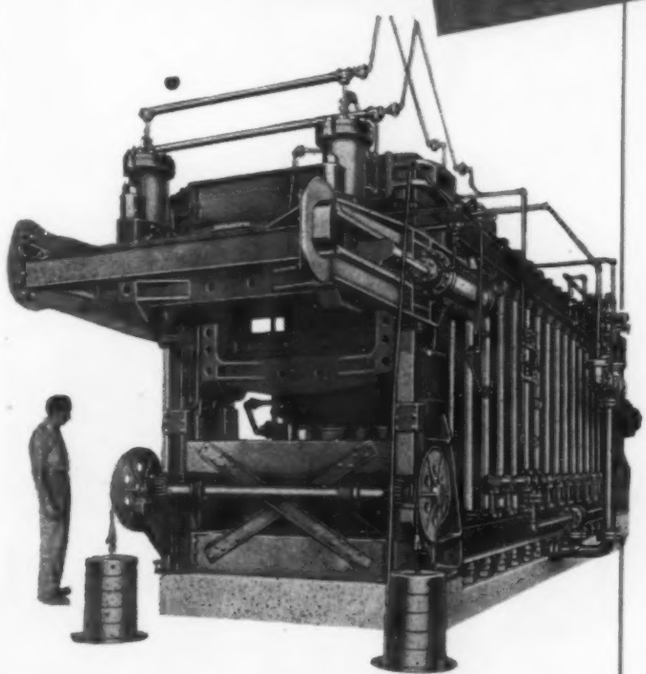
SYNTHETIC RESINS • CHEMICAL COLORS • PHENOLIC PLASTICS • INDUSTRIAL CHEMICALS

THIS NEW

IMPROVED

ADAMSON UNITED BELT CURING PRESS

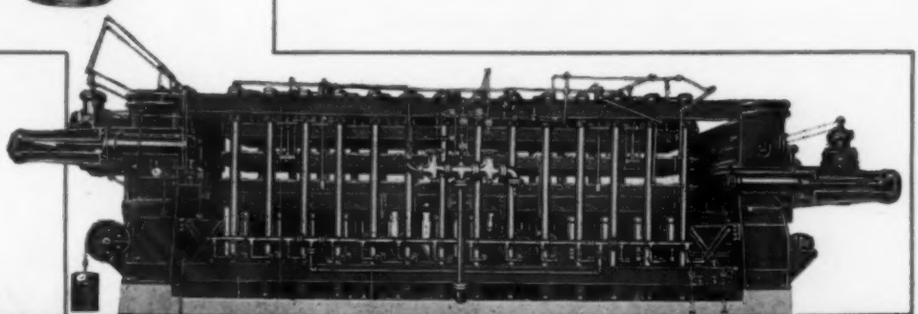
will help you meet Industry's growing demand for CONVEYOR BELTING



This press has two openings permitting two lengths of belting up to 60 inches in width running in opposite directions, to be cured simultaneously. It is equipped with polished platens 63 inches wide by 31 feet long. Twenty-eight rams provide pressure during the curing operation. Proper belt tension is maintained by means of a clamp at one end and a stretcher at the other. These are mounted on separate stands rigidly braced by heavy compression members which extend the full length of the press. The clamp holds the belt while the stretcher is hydraulically pushed away from the press to give the belt the required stretch.

An exclusive Adamson United feature is the means of raising and lowering the stretcher clamps to maintain exact alignment of the press platen surface with the adjustment clamp surfaces. This mechanical method, much superior to hydraulic synchronization, causes the clamps and stretchers to move in perfect unison with the platen, eliminating entirely the possibility of the belt bending over the edges of the platen ends during the curing process.

Designs and manufacturing capacity are immediately available for duplications of this or other types and sizes of Adamson United Belt Presses. Our engineers are prepared to create entirely new designs to meet specific operational or product requirements.



End and side views of ADAMSON UNITED BELT PRESS complete with stretchers, clamps, and steam and hydraulic piping with control valves.

ADAMSON UNITED COMPANY

AKRON, OHIO

SUBSIDIARY OF UNITED ENGINEERING AND FOUNDRY COMPANY

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Plants at: PITTSBURGH • VANDERGRIFT • NEW CASTLE • YOUNGSTOWN • CANTON

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"We sure missed you, 'Doc'"

To his many friends who are also users of solvents, the news of Dr. MacGee's release from service with Uncle Sam's Navy is good news.

We believe you'll share our sentiments when we say, "It's good to have you back, 'Doc'. We sure missed you!"

Yes, once again 'Doc' has taken up his old post as head of the Solvents Division of Skelly Oil Company, and once again is devoting his knowledge and skill to helping you turn out better products.

SKELLY

SKELLYSOLVE

SOLVENTS DIVISION, SKELLY OIL COMPANY
SKELLY BLDG., KANSAS CITY, MISSOURI

NOW AVAILABLE:

SYNTRON "SIX-IN-ONE" coating for baby pants

SYNTRON "SIX-IN-ONE" is a special, custom-made coating developed by the Gordon-Lacey research laboratories for solving the problems of fabric coaters . . . coaters of baby pant, crib sheet, high-chair and play-pen pad and similar fabrics.

SYNTRON "SIX-IN-ONE" is the one coating that has these six outstanding qualities:

❶ it is 100% WATERPROOF; ❷ it is BOILPROOF . . . completely withstands boiling water without blistering; ❸ it is SOFT and FLEXIBLE; ❹ it is RESISTANT to ACIDS and ALKALIS; ❺ it is ABRASION-RESISTANT . . . will not scuff or peel; and ❻ it is RESISTANT to OILS and GREASES.

SYNTRON "SIX-IN-ONE" is a typical example of how Gordon-Lacey develops custom-made coatings to fit your individual needs . . . coatings that are exactly right for your individual product.

SYNTRON* Coatings for PAPER CLOTH METAL

New and better SYNTRON *custom-made* coatings can also be developed for coating cotton, rayon, nylon, fiberglass or any other fabric surface. Gordon-Lacey research laboratories are ready to solve your coating problem whether you're servicing the RAINWEAR, SHOE, HOUSE FURNISHINGS, CLOSET ACCESSORIES, BATHROOM SHOWER CURTAINS, SPORTSWEAR, TOYS, or any other trade. Send us the story of your coating problem.

For full information write

GORDON-LACEY
Chemical Products Co.
57-02 48th ST. • MASPETH, N. Y.

In the business race ahead MUEHLSTEIN service
can help you to get off to a good start . . .
and give you what you need to keep out front.

Crude
Synthetic
Scrap
} RUBBER

Also **HARD RUBBER DUST** *and* **BALATA**

LET US SERVICE YOUR RUBBER RESERVE PERMITS

Consult Our Nearest Office

H. MUEHLSTEIN & Co. INC

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QUALITY CHEMICALS MAKE QUALITY RUBBER PRODUCTS

FOR UNIFORMITY AND PURITY IN RUBBER CHEMICALS ORDER THESE GENERAL CHEMICAL PRODUCTS:

BASIC CHEMICALS
GENERAL CHEMICAL COMPANY
FOR AMERICAN INDUSTRY

Sulfur: Commercial Rubbermakers' and other grades.

Sulfuric Acid: All grades and strengths.

Aluminum Sulfate: To precipitate polymerized synthetic rubbers.

Fluosulfonic Acid: For production of Boron Trifluoride.

Potassium Cyanide—Sodium Cyanide: In production of acrylonitrile rubbers.

Copper Fluoborate—Zinc Fluoborate—Copper Cyanide—Sodium Cyanide: Intermediates for "plating" rubber to metals.

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Baker & Adamson Reagents and Fine Chemicals

GENERAL CHEMICAL COMPANY
40 RECTOR STREET, NEW YORK 6, N. Y.

Sales and Technical Service Offices: Atlanta • Baltimore • Boston • Bridgeport (Conn.) Buffalo • Charlotte (N. C.) • Chicago • Cleveland • Denver • Detroit • Houston • Kansas City • Los Angeles • Minneapolis • New York • Philadelphia • Pittsburgh • Providence (R. I.) San Francisco • Seattle • St. Louis • Utica (N. Y.) • Wenatchee • Yakima (Wash.)

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for **INSULATED WIRE**

Tensile strength

Resistance to aging

Dielectric strength

Write Our Technical Service Dept. for Details

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BAKER PLASTICIZERS

IMPART

Retained Flexibility

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VINYL RESINS CELLULOSE RESINS

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UREA FORMALDEHYDE RESINS

AND

GR-S GR-N GR-M

THE

BAKER CASTOR OIL COMPANY

Established 1857

120 Broadway, New York 5, New York

Chicago, Illinois Los Angeles, California

Announcement

TO THE

AUTOMOBILE INDUSTRY

WE ARE READY

with a complete line of synthetic rubber latex adhesives, coatings and saturants, compounded to meet your specific requirements.

General Latex & Chemical Corp.

666 MAIN STREET • CAMBRIDGE, MASS.

Vultex Division — Verdun Industrial Buildings
River St., Verdun, Montreal, Quebec

Agents for Rubber Reserve Company for storage and distribution of natural rubber latex. Distributors for Rubber Reserve Company for synthetic latex. Operators of the Government-owned Baytown, Texas, synthetic rubber plant in collaboration with the General Tire & Rubber Co.

Season's Greetings

AND

BEST WISHES FOR THE NEW YEAR

PENNSYLVANIA INDUSTRIAL
CHEMICAL CORPORATION
CLAIRTON • PENNSYLVANIA

Gone Today... *Here* Tomorrow

HITE RUBBER goods as they were known before the war will soon be back. When natural rubber again is available TITANOX still will be on hand to give your products the unsurpassed whiteness, brightness and clarity of tint that make for marketability.

In the war-time production of rubber goods TITANOX pigments, because of their intense whiteness, helped the compounder to achieve the highest degree of whiteness possible in synthetic rubber and reclaim.

Our Technical Service Department is ready to cooperate with you in any problem involving the use of white pigments in rubber.

TITANIUM PIGMENT CORPORATION
SOLE SALES AGENT

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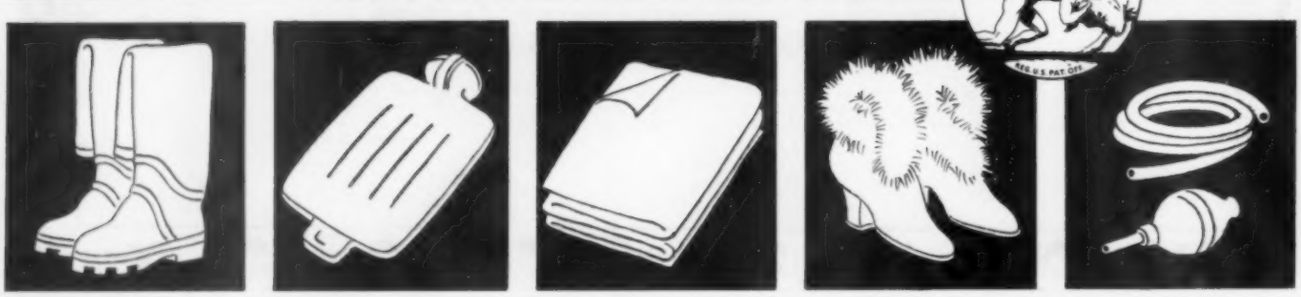

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THE "Big 3" AT CYANAMID

AERO Brand *	Acrylonitrile DOTG and DPG Dibutyl-Phthalate Rubber Sulphur Casein
ACCELERATOR #49**	Accelerator for natural rubber and activator for primary accelerators for GR-S.
AERO AC 50**	Delayed action activator for the thiazole type of accelerators
AERO AC 165**	Self activating accelerator for GR-S
K & M	Magnesium Oxide Magnesium Carbonate
AEROSOL*	Wetting Agents

WHEN PERFORMANCE COUNTS... CALL ON CYANAMID

SALES REPRESENTATIVES TO THE RUBBER INDUSTRY AND STOCK POINTS: Akron Chemical Company, Akron, Ohio. Ernest Jacoby & Company, Boston, Mass. • Herron & Meyer, Chicago, Ill. • H. M. Royal, Inc., Los Angeles, Calif. • H. M. Royal, Inc., Trenton, N. J.

American CYANAMID & Chemical Corporation

(A Unit of American Cyanamid Company)

30 ROCKEFELLER PLAZA · NEW YORK 20, N. Y.

CHECK THESE 2 ✻ PERFORMANCE PROVED CEMENTS AGAINST YOUR NEEDS!

N-100 SELF-CURING ADHESIVE ✻

for cementing together or one to another raw fabrics, coated fabrics, molded parts, leather, wood, paper, tubing, sponge, channel-stock, stripping and sheet material . . . *as a Sealant* for rubber and synthetic valve seats, gaskets, etc.

A Two-Part Neoprene Base Formula of Brush Viscosity and Neutral in Color

. . . Extremely high green strength . . . Good strength after standing 3 to 4 hours . . . Optimum cure reached in 10 days at 68-70°F (in 16 hours at 100-125°F; in 1 hour at 255-260°F) . . . Excellent water, oil, flame and delamination resistance . . . Chemical resistance to acetic acid, alcohols, aliphatic hydrocarbons, ammonia, calcium chloride, copper sulphate, fatty acids, hydrochloric acid, oxalic acid, phenol, sodium hydroxide, sulfuric acid . . . Extremely high shear strength . . . Contains no Benzol.

N-800 NEOPRENE PUTTY ✻

for Filling rubber, neoprene and other synthetic rubber parts . . . *for Repairing* wire cable . . . *as a Binder . . . and for Caulking.*

A Two-Part Neoprene Base Formula of Putty Consistency and Black in Color

. . . Bonds without Primers . . . Optimum cure reached in 10 days at 68-70°F (in 16 hours at 100-125°F; in 1 hour at 255-260°F) . . . High dielectric strength . . . Excellent water, oil and flame resistance . . . Chemical resistance to acetic acid, alcohols, aliphatic hydrocarbons, ammonia, calcium chloride, copper sulphate, fatty acids, hydrochloric acid, oxalic acid, phenol, sodium hydroxide, sulfuric acid.

✻ Both of these formulas have been *performance-proved* in important war production work over a period of several years.

Address all inquires to the Union Bay State Chemical Company, Rubber Chemicals Division, 50 Harvard St., Cambridge 42, Massachusetts.

UBS

UNION BAY STATE *Chemical Company*

Serving Industry with Creative Chemistry

ORGANIC CHEMICALS · SYNTHETIC LATEX · SYNTHETIC RUBBER
PLASTICS · INDUSTRIAL ADHESIVES · DISPERSIONS
COATING COMPOUNDS · IMPREGNATING MATERIALS · COMBINING CEMENTS

tires
footwear
mechanicals

LMADE FROM GR-S

are improved

BY THE USE OF

NEVOLL

because it contributes to high abrasion resistance, low permanent and compression set, higher tensile strength and elongation, lower hysteresis and greater resilience, and better low temperature flexibility.

Now available for prompt shipment in tank-cars or drums.

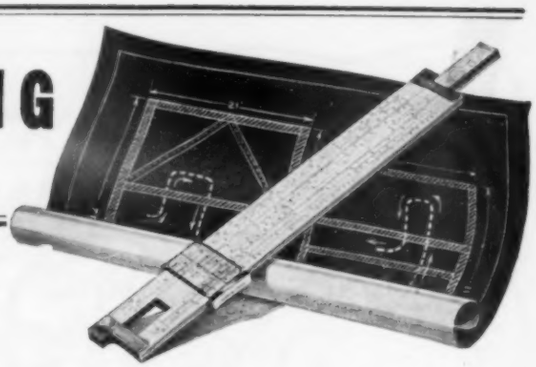
NEVOLL *improves calendering and assists in wetting fillers.*

THE NEVILLE COMPANY
PITTSBURGH 25, PA.

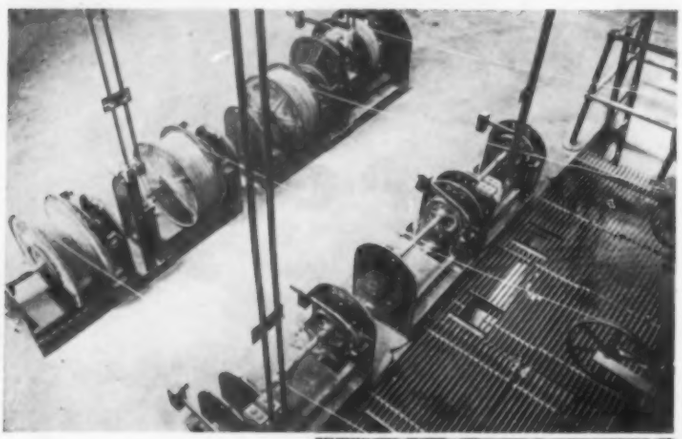
Chemicals for the Nation's Vital Industries

R10

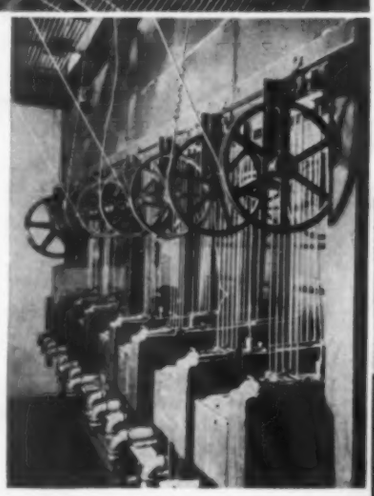
OVEN ENGINEERING NEWS



Automatic Coating Systems for Rubber and Synthetic Materials Make Processing Easier and Faster



Above: Here are the controlled-tension payoff stands for an eight-end wire and cable lacquering system which was designed, built and installed by the Industrial Oven Engineering Company. The wire is drawn from the payoffs through the saturation and lacquer pots (right).



IOE coating systems have a wide range of applications in many industries. The one shown on this page is used in applying saturants and lacquers to insulated wire and cable. The same basic system is used for the processing of cords, yarns, fabrics, paper, surgical suture, fishline, V-belt cord and other continuous materials, applying such coatings or impregnants as rubber, latex, solvent resins, plastics, polyvinyls, silicones and silicone rubbers.

A standard eight-end system will saturate and coat at speeds ranging from 100 to 200 feet per minute, applying from one to 12 coats in a continuous automatic process, and producing up to 768,000 feet of finished material per eight-hour day. Any number of coats can be applied successively. **IOE** coating systems are easy and economical to operate.

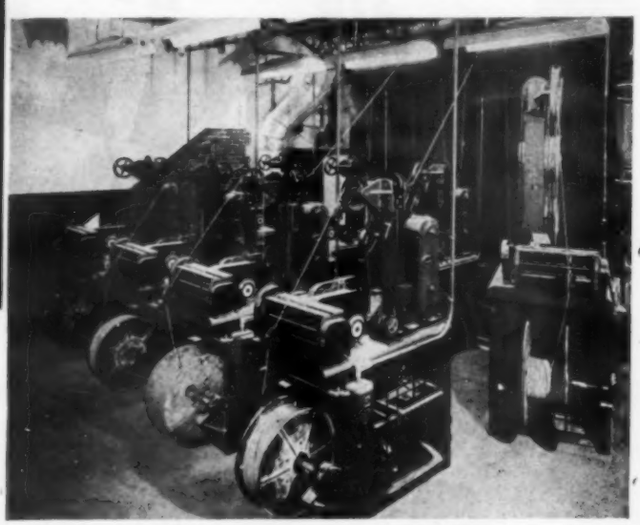
One man can handle an eight-end system, bringing labor cost down to rock bottom. Proper oven engineering results in improved finish, reduced heating costs and elimination of explosion risk, regardless of the volatility of solvents employed. Electricity, gas, oil or steam can be used. High-speed, constant-tension take-up machines handle materials under tensions ranging from a few ounces to hundreds of pounds without breakage. Efficient coating pots and wipers add to the quality of the finished work.

If you are doing a coating job at speeds lower than those mentioned above and with results which are not completely satisfactory to you, why not get in touch with us? We can tell you, without wasting your time, whether or not you need an **IOE** system.

FABRIC CEMENTING

IOE also designs and builds America's most modern tire fabric cementing systems. Write for our RUBBER AGE reprint on this subject.

Below: The eight windup machines corresponding with the payoffs in the photograph left above. These constant-tension, variable-speed units draw the wire from the payoffs, through the saturation and lacquer pots, and through the oven tower which is shown in the background, winding it onto reels after the lacquering and drying process has been completed.



(This is No. 22R of a series. Reprints of previous advertisements sent free upon request.)

ENGINEERING VERSATILITY

THE INDUSTRIAL *Oven Engineering* COMPANY

11621 DETROIT AVE., CLEVELAND 2, OHIO

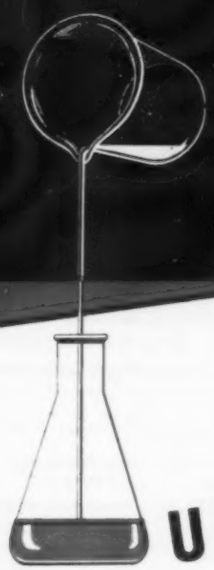
Engineering Representatives in Principal Industrial Areas

★ **ASSOCIATED COMPANY: JAMES DAY MACHINERY LTD., LONDON, W. 1, ENGLAND** ★

Peace-time demands for NEOPRENE COMPOUNDED PRODUCTS

give new importance to CALCINED MAGNESIA

made under controlled temperature



IT'S UNIFORM

1. UNIFORM wetting power and ease of dispersion
2. UNIFORM dispersion with improved stabilizing effect
3. UNIFORM quality maintained in moisture-proof packaging

"Give us more Neoprene compounded products." Every day the demand increases as war-time experience with Neoprene becomes known.

The sharp rise in the use of Neoprene for many new products makes it doubly important for Neoprene compounders to know the importance of selecting a uniform Calcined Magnesia.

And one vital factor in the uniformity of Calcined Magnesia is controlled temperature in manufacturing. Baker gives you this plus with specially built electric ovens. This electrically controlled calcining process gives definite uniformity and also eliminates possibility of oxide contamination from products of combustion.

The indexes of chemical purity for Calcined Magnesia are extremely high. The indexes for iron and calcium are extremely low. The processing of neoprene is still a very sensitive operation. That is why you will be interested in the distinctive features of Baker's Calcined Magnesia, shown in the panel.

We urge you to test Baker's Magnesium Oxide (Neoprene grade). Test it for its ease of dispersion—its ease of compounding of stock—its rate of cure — its tensile strength — and its plasticity. Learn why Baker's light Calcined Magnesia is better. Send for free samples.

J.T. Baker Chemical Co., *Executive Offices & Plant:* Phillipsburg, N. J.
***Branch Offices:* New York, Philadelphia, Boston and Chicago.**

Baker's *Light* CALCINED MAGNESIA

(MAGNESIUM OXIDE)

Technical Bulletin No. 16 — on the Compounding of GR-S with Substantial Loadings of Zinc Oxide

GR-S-10 (Rosin Soap Polymer) with 100 Parts of Zinc Oxide

"El Sixty" Acceleration

(Refer to Technical Bulletins Nos. 9, 10, 11, 13, and 14)

GR-S-10 reinforced with 100 parts of Kadox-15 Zinc Oxide continues to show good performance with varied acceleration. Zinc Oxide with "El Sixty" develops excellent stress-strain properties, with moderately low set; the tear resistance is measurably higher than with regular GR-S. GR-S-10 generally gives lower room temperature rebound values than GR-S, but the heat generation, as determined by the Flexometer, is in a satisfactory range. The cut-growth resistance is good.

Compound No. 16

GR-S-10	100.0
Sulfur	3.0
"El Sixty"	2.0
Coumarone-indene Resin	3.0
E.L.C. Magnesia	5.0
Zinc Oxide	100.0

ORIGINAL RESULTS

Time of Cure Min. at 45 Lb.	Tensile Strength (psi)	Per Cent Elongation	Modulus Load (psi) for Elongation of:				Permanent Set	Shore Hardness	Tear Resistance Tested at:	
			200%	300%	400%	500%			Room Temp.	100°C.
15	745	1165	75	110	150	185	.43	30	104	30
30	1690	985	115	190	270	385	.34	37	105	50
45	1850	845	155	270	385	500	.28	40	87	60
60	1870	775	185	300	410	600	.26	42	80	47
90	1820	740	235	350	465	660	.19	44	87	39
120	1810	735	230	345	460	690	.16	44	90	41

Time of Cure Min. at 45 Lb.	Goodyear-Healey Pendulum		Compression Fatigue (Goodrich Flexometer)*					Cut-Growth Resistance Inches—Failure at	
	Indentation in mm.	Per Cent Rebound	Per Cent Initial Comp.	Running Time and Per Cent Permanent Set	Max. Temp. Rise °C.	Dynamic Compression		2,000 Cyc.	11,000 Cyc.
						Initial	Final		
120	8.19	55.1	27.6	15'—3.3	22.6	18.1	19.5	.05	.35

*Test Conditions: 100 Lb. Load. 0.15" Stroke. 100°C. Oven Temp.

Uniform Quality HORSE HEAD ZINC OXIDES

THE NEW JERSEY ZINC COMPANY
160 FRONT STREET • NEW YORK 7, N. Y.
Products Distributed by THE NEW JERSEY ZINC SALES COMPANY
NEW YORK • CHICAGO • CLEVELAND • SAN FRANCISCO

A GOOD TEAM TO SOLVE MANY PROBLEMS...

Perbunan 18

AND

Perbunan 26

SYNTHETIC RUBBER

RECIPE:

	No. 8625-1-2
Perbunan	100.0
Zinc Oxide	5.0
Stearic Acid	1.0
Medium Thermal Black	150.0
Altax	1.0
Sulfur	1.5

COMPARISON

PHYSICAL PROPERTIES:	PERBUNAN 18	PERBUNAN 26
Tear Test ASTM D624-44 at Room Temperature	315	350
Compression Set ASTM D395-40T Constant Load (Method A) 22 hours at 158° F.	9.1	6.4
30% Constant Deflection (Method B) 22 hours at 158° F.	19.8	17.1
70 hours at 212° F.	59.5	59.3
Hardness and Stress Strain Properties ASTM D314-39 and D412-41 Cured 60 minutes at 287° F. Original:		
Shore Hardness	64	72
Tensile psi	1775	1870
Elongation at Break per cent	325	300
Modulus; psi at 300% Elongation	1675	1870
Aged 70 hours at 212° F. Shore Hardness	80	83
Tensile psi	2055	1955
Elongation at Break per cent	215	200
Aged 70 hours at 212° F. in ASTM Test Oil Number 3 Shore Hardness	38	58
Tensile psi	1500	2235
Elongation at Break per cent	345	370
Volume Increase per cent	35.2	17.4
Aged 70 hours at 300° F. in ASTM Test Oil No. 1 Shore Hardness	57	68
Tensile psi	1260	1795
Elongation at Break per cent	175	150
Volume Increase per cent	4.5	0.9

THIS COMPARISON OF PERBUNAN 18 WITH PERBUNAN 26 in a highly loaded compound highlights the properties which make Perbunan 18 important to you. Perbunan 18 can be compounded to have tensile, hardness, compression set and tear values similar to those which can be obtained with Perbunan 26. But, in addition, Perbunan 18 has unique properties which expand the horizon for the engineering uses of rubber by providing:

1. Good flexibility at very low temperatures.
2. Moderate swell even in high aniline lubricating oil.

A gasket or seal made from Perbunan 18 would have a wider temperature range of serviceability and just enough volume increase to insure against leakage and to make a secure joint.

PERBUNAN 18 is the same top-notch engineering material as PERBUNAN 26 . . . choose the one of this versatile team that will help you solve your problem.

The Stanco rubber technologist knows how to develop rubber parts from Perbunan 18, keeping in sight the cost competition factor! These men are anxious to help with tough problems. Don't hesitate to get in touch with the office nearest you.

PERBUNAN
REG. U. S. PAT. OFF.

THE SYNTHETIC RUBBER THAT RESISTS OIL, COLD, HEAT AND TIME

STANCO DISTRIBUTORS, INC., 26 Broadway, New York 4, N. Y.; First Central Tower, 106 So. Main St., Akron 8, Ohio; 75 East Wacker Drive, Chicago 1, Illinois. West Coast Representatives—H. M. Royal Inc., 4814 Loma Vista Avenue, Los Angeles 11, California. Warehouse stocks in New Jersey, Illinois, California and Louisiana.

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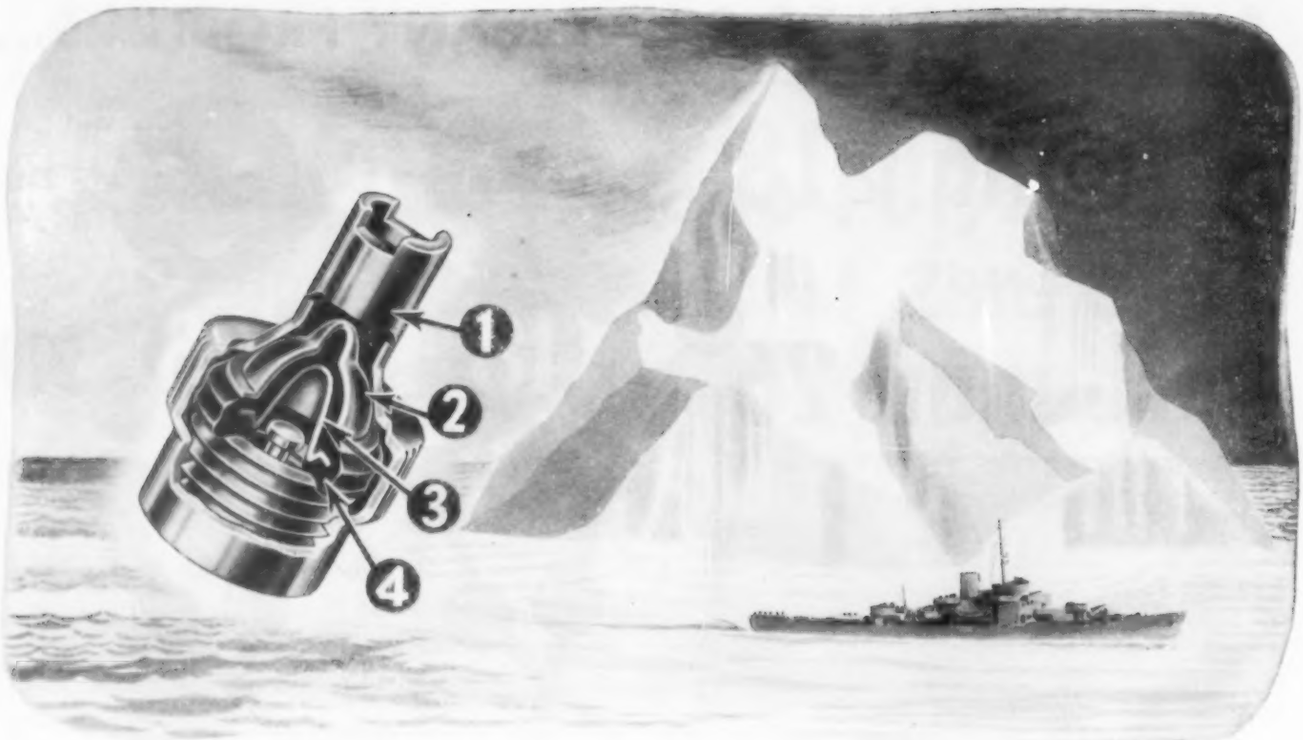


SEAL WINTER OUT

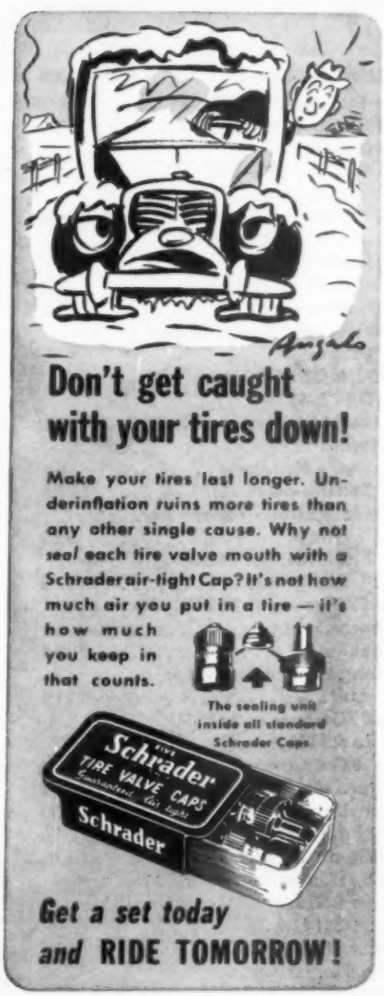
WINTER is tough on tires and unprotected valves. Schrader Caps help protect them by keeping slush, water and snow from entering the valve and freezing inside. They make a positive seal that *keeps air in—dirt and water out.*

Standard Schrader Caps with their 1-2-3-4 piece construction are rugged. They *seal winter out* and help prevent underinflation which breaks down sidewalls and ruins tires.

The Schrader advertisement (reproduced at the right) will appear in December in such publications as *The American Weekly, Collier's, The Saturday Evening Post, Capper's Farmer* and *Country Gentleman*—telling your customers to "Make your tires last longer" by capping every valve.

Check your stock of Schrader Products and order your needs now.

AIR-TIGHT CAPS are vital for TIRE CONSERVATION


Don't get caught with your tires down!
Make your tires last longer. Underinflation ruins more tires than any other single cause. Why not seal each tire valve mouth with a Schrader air-tight Cap? It's not how much air you put in a tire — it's how much you keep in that counts.
The sealing unit inside all standard Schrader Caps
Schrader
TIRE VALVE CAPS
Schrader
Get a set today and RIDE TOMORROW!

A: SCHRADER'S SON, ***Division of Scovill Manufacturing Company, Incorporated,*** **BROOKLYN 17, NEW YORK**

Silene EF

Another important use of Silene EF (a hydrated calcium silicate) is as a highly effective filler in GR-M stocks prepared for resilient industrial rolls. As recently reported* Silene EF confers numerous qualities essential to such stocks in the medium-hard to hard range.

GR-M stocks loaded with Silene EF are very pliable, stable in storage, easily calendered and possess greatly superior ply adhesion properties. In addition they are unique in their reaction upon exposure to hot water or steam. Highly loaded stocks, for example, first swell when so exposed, but soon reduce somewhat on continued exposure, finally becoming constant in size. The hardness is increased appreciably.

Uniform hardness throughout the compound may be obtained by incorporating ethylene glycol during mixing. By judicious balancing of Silene EF and ethylene glycol, a fairly wide range of hardness can be covered. ("High Hardness Water-Resistant Neoprene Stocks," by F. W. Gage, India Rubber World, page 590, August, 1945.)

Silene EF is serving in many diversified natural and synthetic rubber products, and its use is constantly expanding. You are invited to write for information dealing with specific compounding problems.

**Source of Report furnished on request.*

COLUMBIA CHEMICALS

PITTSBURGH PLATE GLASS COMPANY • COLUMBIA CHEMICAL DIVISION

GRANT BUILDING, PITTSBURGH 19, PENNSYLVANIA

Chicago • Boston • St. Louis • Pittsburgh • New York • Cincinnati • Cleveland • Philadelphia • Minneapolis • Charlotte • San Francisco

When You Plan For The Busy Days Ahead

"THE LABORATORY GROUP"—fresh from the press—will tell you why the Royle #½ and the Royle #1 are the extruding machines you will want to know more about when you plan for the busy days ahead and put those plans into operation. In an entirely evolutionary manner features are built into Royle extruding machines which will secure successful results with the lengthening list of extrudable compounds.

Whether your plans involve research or light product extruding "THE LABORATORY GROUP" bulletin gives you the basic data you will require . . . if you plan a program of research you will find that the Royle #½ and the Royle #1 possess the characteristics for heavier extruding. . . . If you plan a program of light product extruding you will find it easier and more profitable to use an extruding machine specifically designed for light product extruding.

Send for your copy of "THE LABORATORY GROUP" and let it suggest to you how these Royle extruding machines—the #½ and the #1—can meet your specific requirements.

JOHN ROYLE & SONS

ROYLE PATERSON N. J. 1880

PIONEERED THE CONTINUOUS EXTRUSION PROCESS IN

James Day (Machinery) Ltd.
London, England
REgent 2430

Home Office
B. H. Davis J. W. VanRiper
SHerwood 2-8262

Akron, Ohio
J. C. Clinefelter
UNiversity 3726

PATERSON 3, NEW JERSEY

You, too, may find

ORTHO-NITROBIPHENYL

the plasticizer

you have been looking for

Monsanto Ortho-Nitrobiphenyl has so many uses that we suggest you send for samples today for your own experimentation. You, too, may discover that it is the plasticizer you have been searching for.

Ortho-Nitrobiphenyl is available in two technical grades. One is just as effective as the other, but Technical Grade A should be used where color is important in the finished product. Carlot prices, f.o.b. St. Louis are: Technical Grade A, 10c a pound; Technical Grade B, 6c a pound. Immediate shipment can be made of both grades in any quantity you desire.

As a plasticizer, ortho-nitrobiphenyl can be used alone or with other plasticizers. It is applicable to the entire range of synthetic resins from the cellulose esters and ethers through the vinyls and vinyl copolymers. It is compatible with alkyds and some synthetic rubbers.

Technical information and samples will be sent promptly on request. Just fill in the coupon below, contact the nearest Monsanto office or write: MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 1700 South Second Street, St. Louis 4, Missouri. District Offices: New York, Chicago, Boston, Detroit, Charlotte, Birmingham, Los Angeles, San Francisco, Seattle, Montreal, Toronto.

PHYSICAL AND CHEMICAL PROPERTIES

(From Typical Analyses)

FORMULA	NO_2
MOLECULAR WEIGHT	199.20
MELTING POINT	Approx. 35°C. (Supercools Readily)
BOILING POINT AT 10 MM.	Approx. 172°C.
BOILING POINT AT 760 MM.	Approx. 330° C.
REFRACTIVE INDEX AT 25°C.*	Approx. 1.613
SPECIFIC GRAVITY AT 40° 15.5°C.	Approx. 1.189
VISCOSITY AT 25°C.*	38 Centipoises
VISCOSITY AT 45°C.	12 Centipoises
WEIGHT/GALLON	Approx. 9.9 lbs.
FLASH POINT	143°C. (289.5°F.)
FIRE POINT	179°C. (354.5°F.)

**Obtained on supercooled material*

SOLUBILITY: Practically insoluble in water (either hot or cold). Readily soluble in —

Benzene	Ethyl Acetate	Mineral Spirits
Ethyl Alcohol	Amyl Acetate	Pine Oil
Methyl Alcohol	Ortho-Dichlorobenzene	Turpentine
Ether	Carbon Tetrachloride	Linseed Oil
Acetone	Perchlorethylene	Soya Bean Oil
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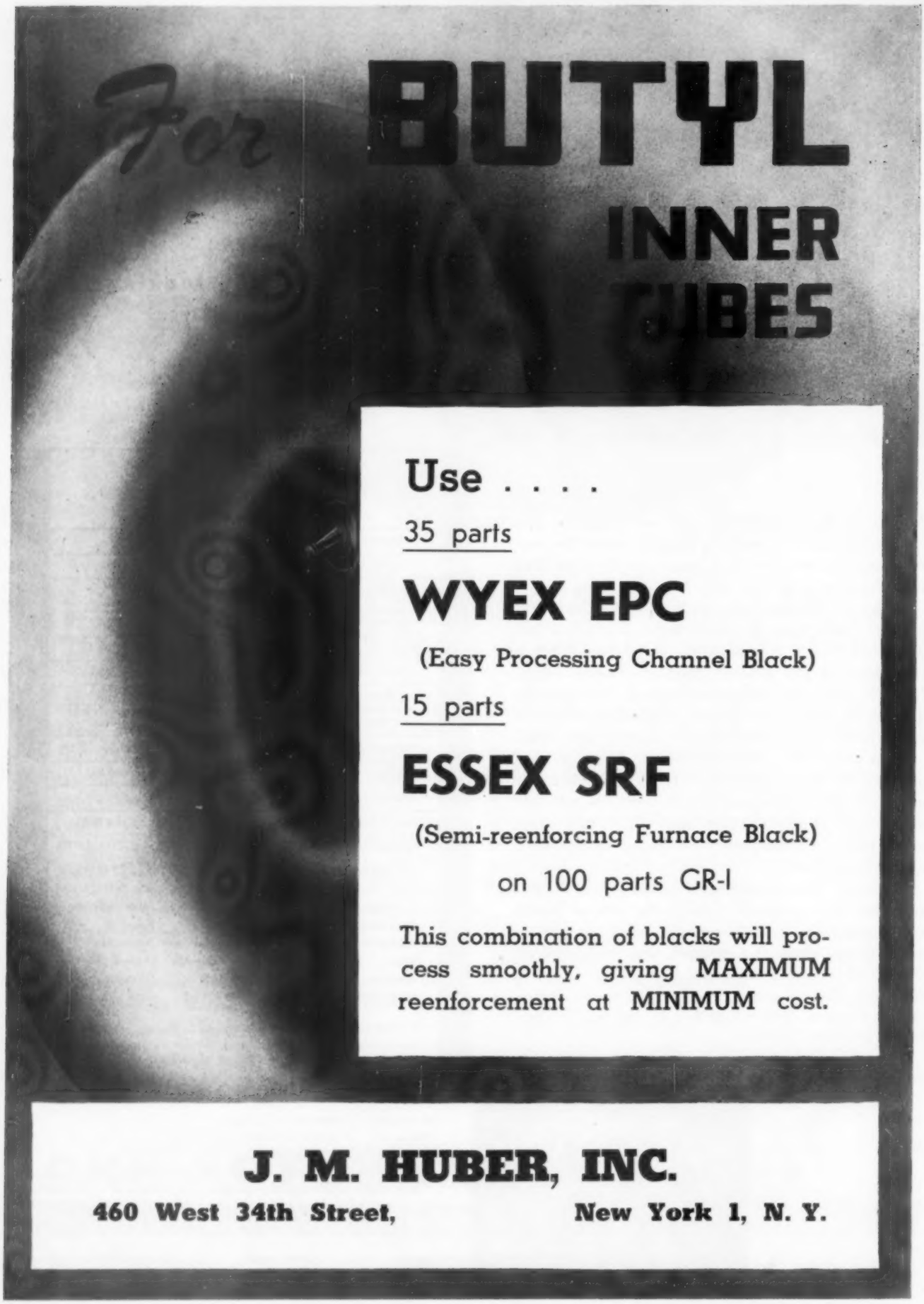
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NUMBER 3

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Published on the 15th of each month by

PALMERTON PUBLISHING COMPANY, INC.

Printing office,
East Stroudsburg, Pa.

Editorial and Advertising Offices,
250 West 57th St., New York 19, N. Y.

New England Representative—F. ROYAL CAREY, P.O. Box 133, Providence, R. I.
Western Representative—IRVING V. KOCH, 64 East Lake St., Chicago, Ill.

Entered as Second Class Matter, October 20, 1933 at the Post Office at East Stroudsburg, Pa., under Act of March 3, 1879. Subscription Rates: Domestic, $3.00 a year; Canada, $3.50; Foreign, $4.00. Single copies up to 3 months old, 35 cents; over 3 months old, 50 cents. Telephone COlumbus 5-2923, 5-2924.

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RUBBER AGE

VOL. 58, No. 3 DECEMBER, 1945

A Comparison of Mineral Pigments in GR-S

By ROSS E. MORRIS, ROBERT R. JAMES, and EDWARD R. EVANS

U. S. Naval Rubber Laboratory, Mare Island, California

THE compounding of mineral pigments into GR-S is of particular interest to the wire and cable industry because this loading is the only type which will give processable stocks with satisfactory electrical properties and adequate physical properties.* This article is primarily a survey of mineral pigments in GR-S from the standpoint of their value in wire insulation stocks, but the results of this survey should be of help when compounding any light-colored GR-S stock. It is not claimed that every mineral pigment used in the rubber industry has been included in this survey, although it is believed that representatives of all the common types have been studied.

The basic recipe used in this investigation, given in Table I, was designed for a continuous-vulcanization wire insulation. A feature of this recipe is the inclusion of 30 parts of Cumar MH resin. This medium-hard, coumarone-indene resin is known to enhance the tensile properties of GR-S stocks containing mineral pigments. The pigments which were tested are listed in Table II.

Not listed in Table II are three pigments which were compounded into the basic recipe and found to give poor processing stocks. These pigments were bentonite clay, gilder's whiting, and magnesium carbonate. The bentonite clay stock was rough after extrusion on to wire and it was porous after cure in high pressure steam. The gilder's whiting stock did not insulate properly; the insulation tended to crack as it left the extruder. The magnesium carbonate stock was very rough after extrusion.

Note: The opinions or assertations in this article are those of the authors and are not to be construed as official or reflecting the views of the Navy Department or the naval service at large.

Mixing and Curing Procedures

The batches were mixed in a size B Banbury where all the ingredients except the accelerators were incorporated. The accelerators were added 16 to 24 hours

TABLE I—BASIC TEST RECIPE

	Parts
GR-S *	100.0
Pigment	50.0†
Zinc oxide	1.0†
Cumar MH2½	30.0
Paraffin	7.0
Stearic acid	0.75
Selenac	1.0
Captax	1.5
D.P.G.	0.5
Sulfur	1.0

* The GR-S for all batches was taken from one bale made at the Goodyear Torrance plant.
† Volumes/100 volumes GR-S.

TABLE II—PIGMENTS INCLUDED IN SURVEY

Identification Number	*Name*	*Additional Information*	*Optimum Curing Time of Insulation Stock at 388° F. seconds*
1	Clay, Dixie		40
2	Clay, MacNamee		40
3	Clay, Catalpo		50
4	Clay, Hydratex		50
5	Clay, Buca		50
6	Clay, Suprex		40
7	Clay, #33		60
8	Atomite	Whiting, water ground	40
9	Witcarb	Whiting, precipitated	30
10	Witcarb R-12	Whiting, precipitated	40
11	Witcarb R	Whiting, precipitated	30
12	Kalite #1	Whiting, coated	20
13	Kalvan	Whiting, coated	60
14	Calcene T	Whiting, coated	40
15	Zinc oxide, XX Red 4		60
16	Zinc oxide, Kadox 15		20
17	Zinc oxide, Kadox 72		30
18	Rayox	Titanium dioxide	50
19	Raycal	Titanium dioxide-barium sulfate mixture	40
20	Silene	Calcium silicate	15
21	Silene EF	Calcium silicate, extra fine	15
22	Cryptone ZS-800	Zinc sulfide	40
23	Albalith (lithopone)	Zinc sulfide-barium sulfate mixture	40
24	Hydrated alumina		40
25	Marter White	Aluminum silicate, ground	30

later on a cold laboratory mill. The same mixing procedures in the Banbury and on the mill were strictly followed for every batch except the batches containing magnesium carbonate and Silene EF. These pigments required a longer time to add in the Banbury because of their bulk.

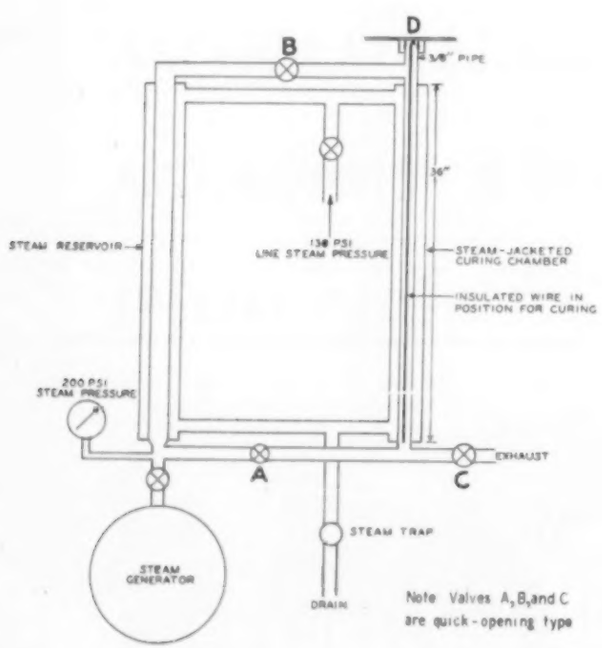


FIG. 1—Drawing of apparatus for rapid cure of wire insulation.

The stocks were cured in the form of wire insulation for physical tests and in the form of molded sheets for electrical tests. A No. ½ Royle extruder with crosshead was used for the application of the wire insulation. Each stock was tubed onto 3-foot lengths of No. 16 U. S. standard gauge steel wire using a 5/32-inch diameter die. The insulation had a wall thickness of 0.05 inch. The molded sheets were 6 inches x 6 inches x 0.05-inch thick and were all cured 10 minutes at 310° F. in a hydraulic press.

The insulated wires were cured by a method designed to simulate the continuous vulcanization process commonly used in the wire and cable industry. The method consisted essentially of curing the insulated wire under 200 p. s. i. steam pressure using a small curing chamber into which the steam could be rapidly introduced. There was a time elapse of 1 to 4 hours between extruding and curing.

The important details of the apparatus used for the curing operation are sketched in Figure 1. Figure 2 illustrates the same apparatus. The curing chamber was insulated and also kept hot between cures by the use of a steam jacket filled with steam at approximately 130 p. s. i. pressure. The rapid entry of 200 p. s. i. steam into the curing chamber was brought about by the use of a quick-opening valve at each end of the chamber. The 200 p. s. i. steam was generated and maintained within 2 p. s. i. of this pressure by a small electrically-heated boiler. The volume of the available steam at 200 p. s. i. pressure was increased by the inclusion of the steam-jacketed reservoir shown at the left side of Figure 1. The steps in the curing cycle are given below, starting at the end of a previous cure (see Figure 1):

a. Valves A and B were closed simultaneously 3 seconds before the end of the cure.

b. Valve C was opened exactly at the end of the cure.

c. Cap D was immediately unscrewed and the cured wire removed.

d. The next specimen of insulated wire to be cured was hung on the hook on the inside of cap D and inserted into the curing chamber.

e. Cap D was screwed into position and valve C closed.

f. Valves A and B were then opened simultaneously and the curing time started.

A preliminary range of cure for 15, 20, 30, 40, 50, and 60 seconds at 200 p. s. i. (388° F.) was made on insulated wires from each stock. All of the stocks were quite flat curing. This is illustrated for the Buca clay, Kalvan, Albalith, and hydrated alumina stocks in Table III. The time of cure for each stock to reach optimum tensile properties is shown in Table II. This time depends not only on the inherent rate of cure of the stock, but also on the rate of heat diffusion through the stock.

Crushing Test

This laboratory has devised a crushing test which is intended to evaluate the resistance of insulated conductors to damage during cabling and application of the jacket in cable manufacture. This test is also intended to evaluate the crushing resistance of the insulated conductors in service. The test consists of compressing an insulated conductor between anvils 2 inches long at the rate of 0.2 inch per minute and noting at what load the conductor cuts through the insulation. The test was conducted at 82° F. and at 200° F. on wires insulated with each stock.

The apparatus used for the crushing test is illustrated in Figures 3 and 4. It consists of two telescoping sheet-metal boxes, each containing a flat hard-steel anvil, 2 inches long. The lower box and anvil are supported on the platform of a universal testing machine. The upper box and anvil are attached to the cross-head of the testing machine. The lower box contains, besides the anvil, four resistance heating units, a motor-driven fan, and a thermocouple. The thermocouple is supported in air in the vicinity of the insulated wire being tested. The thermocouple is the sensitive element for a Tag Celectray indicating controller which controls the temperature of the box by regulating the current passing through the resistance heaters.

The crushing test is conducted as follows:

1. The cross-head is lowered until the boxes telescope and the anvils are just sufficiently far apart to allow the insulated wire to slide between them.

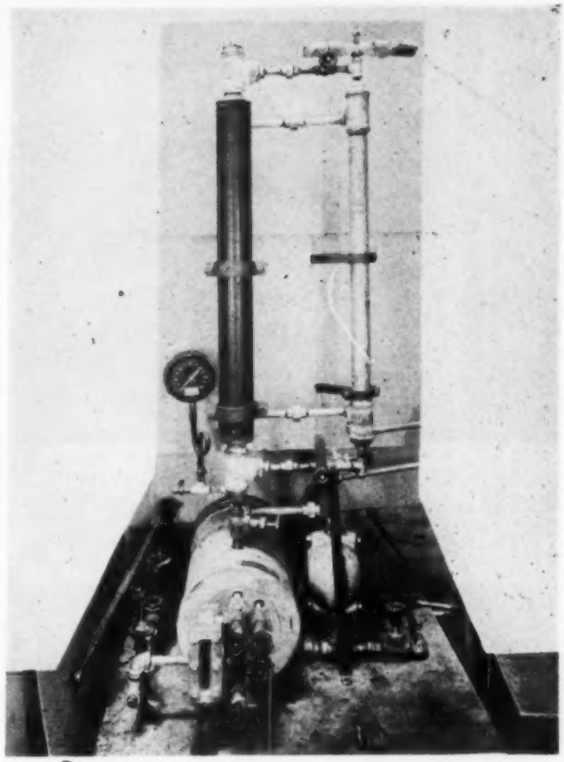


FIG. 2—View of apparatus for rapid cure of wire insulation.

2. When the test is being conducted at 200° F., the apparatus is allowed to warm up to this temperature before proceeding. The temperature is indicated as well as controlled by the Celectray.

3. The insulated wire to be tested is inserted through the holes in the lower box as shown in Figure 3. The holes keep the wire centered on the lower anvil. The opposite sides of the top box are slotted to clear the wire as the box and top anvil move downward.

4. If the test is being conducted at 200° F., the insulated wire is conditioned at this temperature for 10 minutes before testing. Ten minutes was found to be sufficient time for the insulation to reach 200° F. by test with an insulated thermocouple.

5. The conductor in the insulated wire being tested is connected into a low-voltage circuit so that when the conductor cuts through the insulation and contacts

TABLE III—TYPICAL RANGE-OF-CURE DATA FOR WIRE INSULATION

Seconds Cure at 388° F.	Stock No. 5 loaded with Buca Clay			Stock No. 13 loaded with Kalvan			Stock No. 23 loaded with Albalith			Stock No. 24 loaded with Hydrated Alumina		
	T	E	M	T	E	M	T	E	M	T	E	M
15	....	...	...	....	...	...	u	u	u	u	u	u
20	u	u	u	u	u	u	1180	830	120	1400	850	90
30	1170	780	230	1450	880	90	1560	850	120	1570	850	90
40	1320	780	220	1470	870	100	1650	840	130	1670	850	90
50	1480	800	250	1540	840	90	1640	830	120	1620	840	85
60	1480	790	240	1670	850	90	1650	840	120	....	...	..

T = Tensile strength in p.s.i.; E = Ultimate elongation in percent; M = Modulus in p.s.i. at 200 percent elongation; u = Stock was too undercured to test.

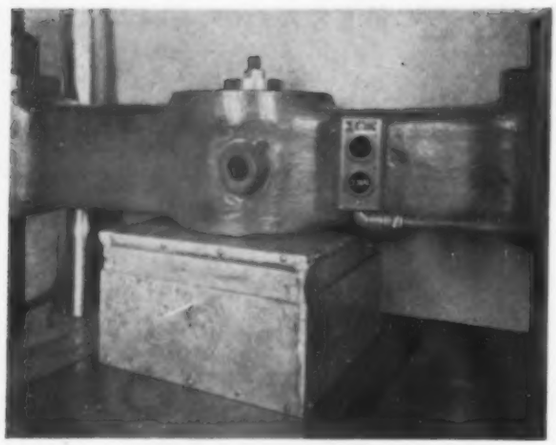


FIG. 3—Arrangement for conducting crushing tests at various temperatures with universal testing machine.

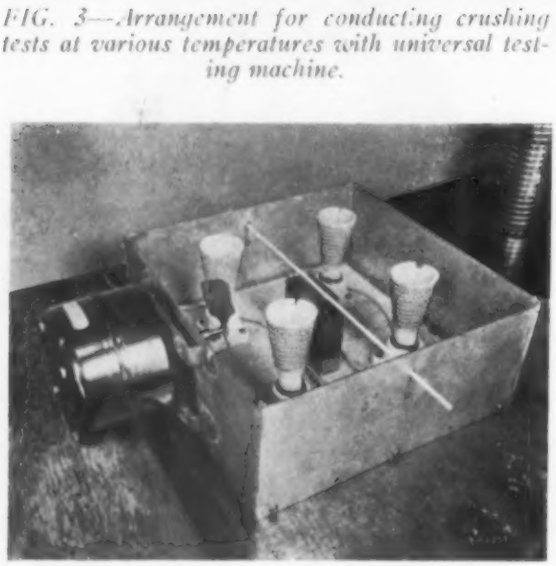


FIG. 4—Lower section of box for conducting crushing tests.

either anvil, it closes the circuit and lights an indicator lamp. The load shown on the dial of the universal tester is noted at this instant.

6. The anvils are brought together at the rate of 0.2 inches per minute while testing. When the load has been recorded for one test, the insulated wire is pulled over for 3 inches and another test is made.

Electrical Tests

The specific resistivities, dielectric strengths, dielectric constants, and power factors of the stocks, molded into 6 inch x 6 inch x 0.05 inch sheets, were determined before and after immersion in distilled water for two weeks at 82° F. The dielectric constants and power factors were determined at frequencies of one kilocycle per second and one megacycle per second. The specific resistivities were determined at 500 volts. The dielectric strengths were determined at the usual frequency of 60 cycles per second.

The apparatus used for the measurements of dielectric constant and power factor at one kilocycle frequency is shown in Figure 5. This apparatus consisted of an audio frequency oscillator, Type 608-A, an audio frequency capacitance bridge, Type 716-B, and a cathode-ray null detector, Type 707-A, all manufactured by the General Radio Company. The apparatus used for the measurements of dielectric constant and power factor at one megacycle frequency is shown in Figure 6. This apparatus consisted of a radio frequency oscillator, Type CAG-60006, a radio frequency bridge, Type CAG-60009, and a radio receiver for detection. The radio frequency oscillator and bridge were manufactured by the General Radio Company. Lead foil electrodes with no guard ring were used in all of the measurements with both bridges. The electrodes were stuck to the vulcanized sheets with a very thin coating of petrolatum. The top electrode was 4 inches in diameter; the bottom electrode was 6 inches square.

The measurements of resistivity were made with a General Radio Type 544-B megohm bridge which is shown in Figure 7. Brass electrodes were used which were wetted lightly with a solution containing Aquarex D and sodium chloride to give good electrical contact. The top electrode was 2½ inches in diameter; the bottom electrode was 6 inches square. No guard ring was used as it was found not to be necessary.

Properties of Stocks

Most of the properties of the stocks are shown in bar graphs. The titles of these bar graphs and their numbers are listed below:

Tensile strength and modulus, Figure 8.
Ultimate elongation, Figure 9.
Crushing resistance, Figure 10.
Dielectric strength at 60 cycle frequency, before and after immersion, Figure 11.
Dielectric constant at one kilocycle frequency, before and after immersion, Figure 12.

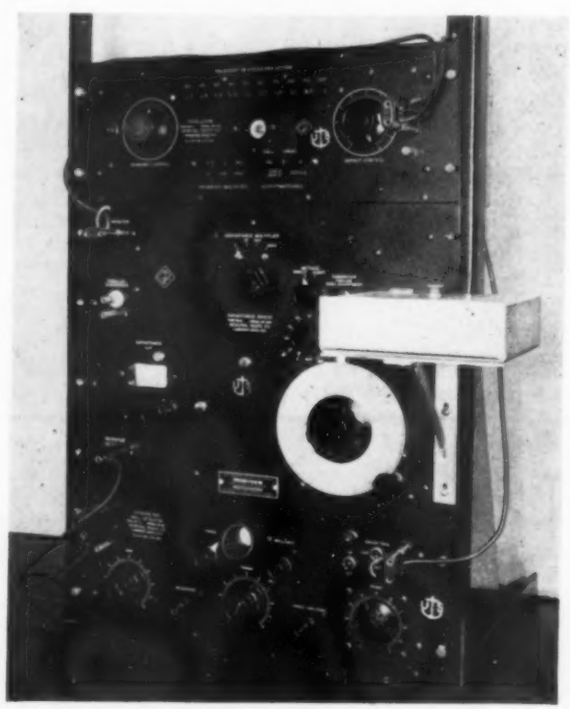


FIG. 5—Apparatus for measuring dielectric constants and power factors at audio frequencies.

Dielectric constant at one megacycle frequency, before and after immersion, Figure 13.

Power factor at one kilocycle frequency, before and after immersion, Figure 14.

Power factor at one megacycle frequency, before and after immersion, Figure 15.

The specific resistivities of the stocks before and after immersion in water for two weeks are listed in Table IV. These data were not amenable to graphical presentation because many of the values were not determinable, being above the range of the megohm bridge.

Analysis of Data

Tensile Strength (Figure 8): The highest tensile strength was given by Rayox. High tensile strengths were given by Cryptone ZS-800, hydrated alumina, Kalvan, Albalith, Silene EF, XX Red 4, and Raycal. The clays and whitings, except for Kalvan, did not give exceptional tensile strengths. The poorest tensile strengths were obtained with Atomite, No. 33 Clay, and Marter White.

Modulus (Figure 8): High modulus is generally preferable for wire insulation because it is a rough measure of resistance to crushing. The highest moduli were given by Silene and Silene EF; these values were about two-thirds higher than moduli given by the clays and Marter White. The clays and Marter White, on the other hand, gave moduli approximately twice as high as the moduli given by the whitings, zinc oxides, titanium dioxide pigments, zinc sulfide pigments, and hydrated alumina.

Ultimate Elongation (Figure 9): Most of the stocks had quite high elongations, ranging between 710 per cent and 870 per cent. The exceptions were the Silene and Silene EF stocks, which had elongations of 550 per cent and 650 per cent, respectively.

Crushing Resistance (Figure 10): Outstanding crushing resistances at room temperature were given by the stocks containing Kadox 72 and Silene EF. The poorest crushing resistances at room temperature were given by the stocks containing the clays, Marter White, and the large particle-size whitings. At 200° F. the crushing resistance of the Silene EF stock was still outstanding, but the crushing resistance of the Kadox 72 stock dropped to a low figure. The crushing resistances at 200° F. of the stocks containing XX Red 4, Silene, Cryptone ZS-800, Witcarb R-12, Albalith, and Kalvan were above the average value obtained at this temperature.

TABLE IV—SPECIFIC RESISTIVITIES

Stock Number	*Pigment*	*Specific Resistivity, ohm-cm. Initial Value*	*Specific Resistivity, ohm-cm. After Immersion in Water for Two Weeks*
1	Clay, Dixie	$>2.0 \times 10^{14}$	1.1×10^{12}
2	Clay, MacNamee	$>2.0 \times 10^{14}$	1.1×10^{12}
3	Clay, Catalpo	$>2.0 \times 10^{14}$	1.7×10^{11}
4	Clay, Hydratex	$>2.0 \times 10^{14}$	1.7×10^{12}
5	Clay, Buca	$>2.0 \times 10^{14}$	1.6×10^{12}
6	Clay, Suprex	$>2.0 \times 10^{14}$	$>2.0 \times 10^{14}$
7	Clay, No. 33	$>2.0 \times 10^{14}$	1.5×10^{12}
8	Atomite	$>2.0 \times 10^{14}$	7.0×10^{11}
9	Witcarb	$>2.0 \times 10^{14}$	$>2.0 \times 10^{14}$
10	Witcarb R-12	$>2.0 \times 10^{14}$	$>2.0 \times 10^{14}$
11	Witcarb R	$>2.0 \times 10^{14}$	$>2.0 \times 10^{14}$
12	Kalite, No. 1	$>2.0 \times 10^{14}$	1.4×10^{12}
13	Kalvan	$>2.0 \times 10^{14}$	$>2.0 \times 10^{14}$
14	Calcene T	$>2.0 \times 10^{14}$	1.4×10^{12}
15	Zinc oxide, XX Red 4	9.9×10^{11}	7.4×10^{11}
16	Zinc oxide, Kadox 15	$>2.0 \times 10^{14}$	7.2×10^{11}
17	Zinc oxide, Kadox 72	2.1×10^{12}	2.4×10^{12}
18	Rayox	$>2.0 \times 10^{14}$	6.8×10^{11}
19	Raycal	$>2.0 \times 10^{14}$	$>2.0 \times 10^{14}$
20	Silene	$>2.0 \times 10^{14}$	5.4×10^{11}
21	Silene EF	7.1×10^{12}	2.7×10^{11}
22	Cryptone ZS-800	$>2.0 \times 10^{14}$	7.7×10^{11}
23	Albalith	$>2.0 \times 10^{14}$	8.9×10^{11}
24	Hydrated alumina	$>2.0 \times 10^{14}$	6.7×10^{11}
25	Marter White	$>2.0 \times 10^{14}$	8.0×10^{11}

Specific Resistivity (Table IV): Of all the pigments, only XX Red 4, Kadox 72, and Silene EF yielded stocks having original specific resistivities less than 2.0×10^{14} ohms. Only six of the stocks retained specific resistivities above 2.0×10^{14} ohms after immersion in water for two weeks. These were the stocks

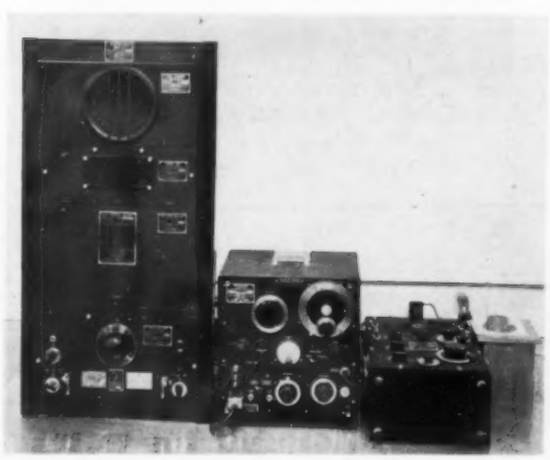


FIG. 6—Apparatus for measuring dielectric constants and power factors at radio frequencies.

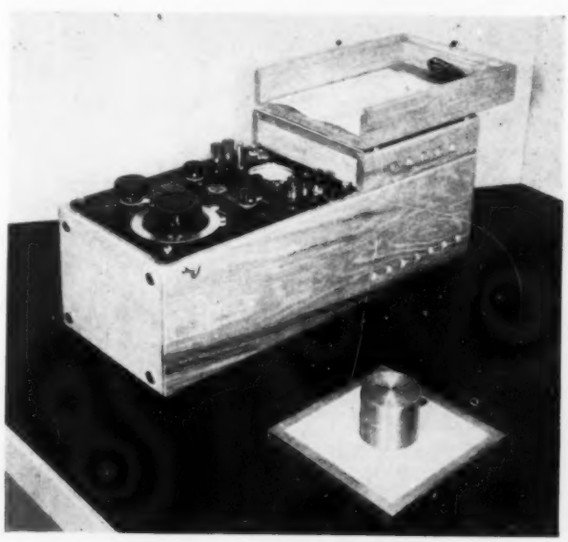


FIG. 7—Megohm bridge for measuring specific resistivities.

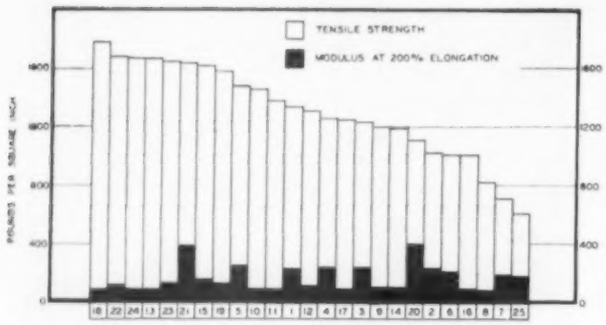


FIG. 8—Tensile strength and modulus.

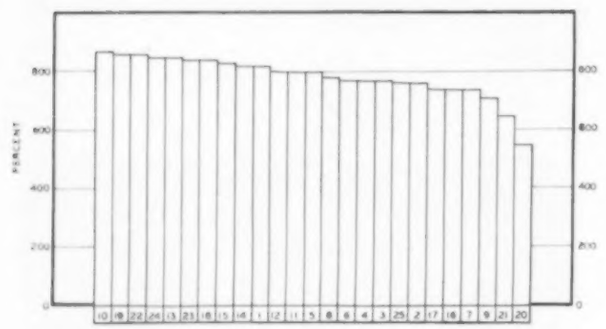


FIG. 9—Ultimate elongation.

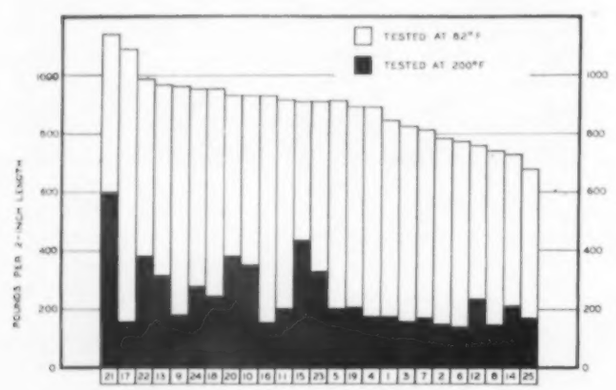


FIG. 10—Crushing resistance.

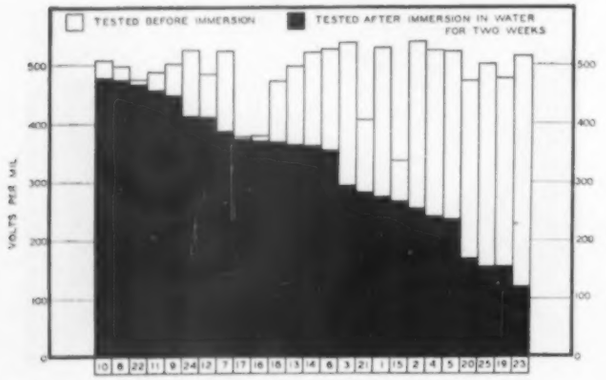


FIG. 11—Dielectric strength at 60 cycle frequency.

compounded with Suprex Clay, the three Witcarbs, Kalvan, and Raycal. None of the other stocks had an exceptionally low specific resistivity after immersion; all had a specific resistivity of at least 10^{17} ohms.

Dielectric Strength (Figure 11): The obvious feature of the plotted data is the severe deterioration in the dielectric strengths of some of the stocks brought about by immersion in water for two weeks. The dielectric strengths of the clay stocks, although high initially, were considerably reduced by immersion in water. The same was particularly true of the stocks containing Silene, Marter White, Raycal, and Albalith. The best stocks from the standpoint of dielectric strengths before and after immersion were those containing the three Witcarbs, Atomite, and Crypton ZS-800.

Dielectric Constant (Figures 12 and 13): A low dielectric constant is generally desirable for electrical insulation. Every stock studied had a higher dielectric constant at a frequency of one kilocycle than at a frequency of one megacycle. With two exceptions, the dielectric constants at both frequencies were raised by immersion in water for two weeks. The dielectric constant of water is very high, so that its presence in the rubber by absorption would be expected to enhance the dielectric constant of the rubber. The two exceptions to the foregoing observation were the dielectric constants at one megacycle frequency of the stock containing XX Red 4 and Rayox. These exceptions, which were rechecked, were due possibly to the leaching action of the water on soluble, polar impurities in the pigments.

The dielectric constants of most of the stocks were not greatly different at the same frequency, and the majority of these values were not raised to any serious extent by immersion. The stocks which had exceptionally high dielectric constants at both frequencies

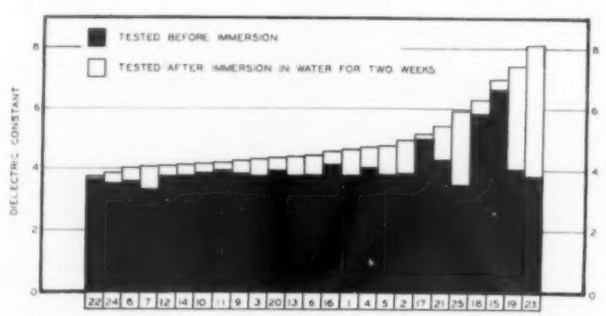


FIG. 12—Dielectric constant at one kilocycle frequency.

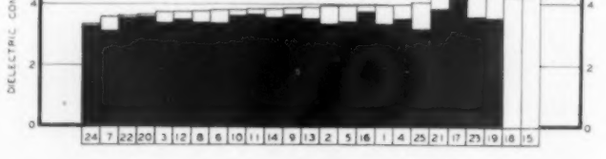


FIG. 13—Dielectric constant at one megacycle frequency.

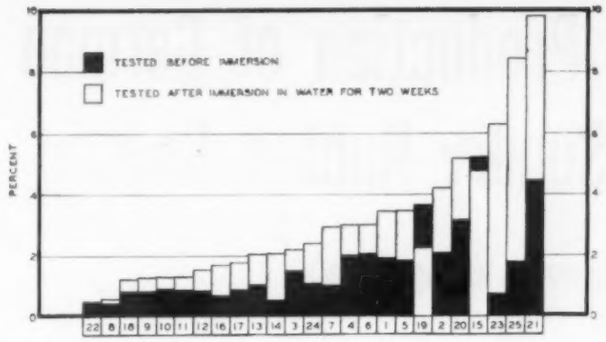


FIG. 14—Power factor at one kilocycle.

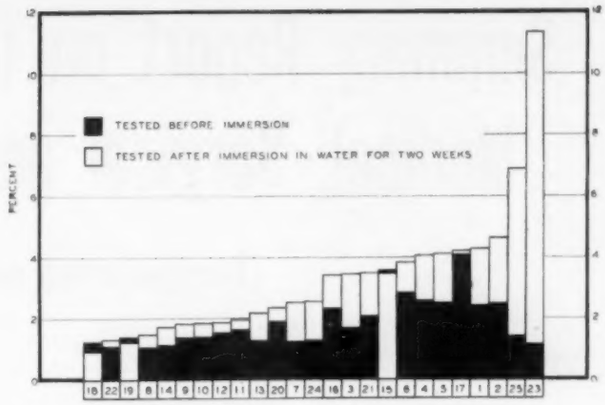


FIG. 15—Power factor at one megacycle.

before immersion were those containing XX Red 4, Kadox 72, and Rayox. The stocks which had exceptionally high dielectric constants at both frequencies after immersion were those containing Raycal and Albalith. The Marter White stock had after immersion a high dielectric constant at the lower frequency but not at the higher frequency.

Power Factor (Figures 14 and 15): The power factor in this case is a measure of the energy lost as heat when electrical insulation is subjected to an alternating voltage. A low power factor is therefore highly desirable. The majority of the stocks had a higher power factor at one megacycle frequency than at one kilocycle frequency. The power factors of most of the stocks increased after immersion in water for two weeks; this was particularly the case with the Albalith and Marter White stocks at both frequencies, and with the Silene EF stock at the lower frequency. The power factors were lowered after immersion at both frequencies in the case of the XX Red 4 and Raycal stocks, and at the higher frequency in the case of the Rayox stock. It will be recalled that the dielectric constants of the XX Red 4 and Rayox stocks at the higher frequency were also lowered by immersion. The lowest power factors in general were obtained with the whitings and the titanium dioxide pigments.

Summary

Some of the physical and electrical properties conferred upon a GR-S base stock by equal volume loadings of various mineral pigments have been determined.

Rubber Cultivation Developments in Peru

IN addition to the propagation of rubber-plant nursery stock, the Tingo Maria Agricultural Experiment Station in Peru is investigating the possibilities of producing rubber as a cash crop. It is thought that rubber can be produced economically on small holdings, and landowners in the vicinity of Tingo Maria have requested nursery stock to plant about 435 acres in 1945 and 1946. According to available information, up to August 1, 1945, a total of approximately 285 acres had been planted on small holdings ranging in size from 5 to 60 acres.

The Peruvian Amazon Corporation has started three rubber plantations totaling approximately 1,250 acres in the rubber-growing area. The northern plantation, of about 250 acres, is at Yuramaguas; the central plantation, of about 750 acres, is at Aguatia, near Tingo Maria, and the southern plantation, of about 250 acres, is at Iberia, in the Department of Madre de Dios. It is generally believed, however, that rubber production on large plantations in Peru will not be a profitable undertaking.

The U. S. Department of Agriculture is carrying on the selection of outstanding Hevea rubber trees in the Peruvian jungle causeways, in accordance with the agreements between the United States and 16 Latin American countries in 1940 and 1941. The major purpose of the program in Peru is to locate the best natural Hevea rubber areas and bring out seed and grafting material of the most superior producing and disease-resistant trees. In cooperation with the Peruvian Ministry of Agriculture and the Peruvian Amazon Corporation, material of these outstanding jungle selections of Hevea is propagated for experimental test plantings in Peru.

By the end of June, 1945, after two years of work, 229 selections had been made from the jungles and from seedling progeny originating from all major rubber-producing regions of Peru. Selection of jungle trees has been carried on principally in the Madre de Dios region. By Peruvian Government decree in 1943, certain lands along the Huanuco-Pucalipa Highway are reserved for rubber experimental purposes.

According to the Lima press, the Peruvian subsidiary of a United States rubber company is no longer using using natural rubber from Eastern Peru.

Summary Report on the Production of German Medical, Surgical and Sundry Rubber Goods

(Compounding and Manufacturing Data)

Surgeons' Gloves

The Limmer plant of Continental was in perfect running condition. There were gloves in the plant in various stages of manufacture. All surgeons' gloves at this plant were made using Buna S solvent cement —the formula for which is as follows:

Buna SS (Defo 200)	76.0
Light Dry Factice (Sulfur Chloride)	15.0
Light Mineral Oil	5.0
Sifted Sulfur	2.5
Active ZnO	1.5
	100.0

The batch is well milled and a cement is made to proper viscosity for dipping with approximately 1 part by weight of stock to 10 parts by weight of gasoline.

In the manufacture of the gloves the porcelain forms are set on a mechanical conveyor system, the forms being dipped, turned to the upright position, passed around through the heated chambers, then dipped a second time and held in the downward position. They again pass through the heated chambers and are dipped down into a hot aqueous accelerator solution for cure. Full details of the type accelerator solution used were not obtained as this is well known in American practice.

After cure the forms are removed from the conveyor and the bottoms of the gloves rolled to form a bead. The gloves are dusted with starch and are then removed, inspected, and packed in transparent paper envelopes.

The quality of the Buna gloves was discussed with the personnel of the plant, and it was decided that while the Buna gloves were not equal in quality to natural rubber gloves from the standpoint of softness, resilience, or tear resistance, they were entirely adequate, since there were no serious complaints regarding the service these gloves had rendered.

The following properties were determined on a Buna surgeons' glove from Germany (the glove was ambidextrous, fitting either hand):

Gauge	.009 inches
Tensile Strength	250 PSI
Ultimate Elongation	430 percent
Ten Sterilizations	350 PSI
Overall Length	10⅜ inches
Size 6½	
Width of Wrist (Flat)	2⅞ inches

Comments: Many particles of dirt in the glove, three pieces large enough to cause blisters. Buttons on tips of fingers. Crotches heavy with thin spots on either side. Rolling at wrist was irregular with no adhesion.

As a matter of interest, recorded herewith is the formula formerly used at this plant for natural rubber surgeons' gloves, the manufacture of which was carried out in a manner identical to that now used for Buna gloves:

Selected Smoked Sheet (Centers)	95.7
Sifted Sulfur	2.3
Fine ZnO	1.0
Zinc Stearate	1.0
	100.0

Smoked sheet was broken down on 50″ or 60″ mills for 20 minutes, three times at 24 hour intervals. Sulfur was mixed in 50/50 masterbatch with smoked sheet. Cement made to proper viscosity by using approximately 1 part stock by weight to 10 parts gasoline by weight.

Household Gloves and Technical Gloves

At the time operations at Limmer ceased, the only dipped Buna latex articles being manufactured were household gloves and technical gloves.

Nothing new or unusual in the dipping process was noted, and it was stated by plant personnel that all methods and procedures for dipped Buna latex goods were identical with methods used for the manufacture of the natural rubber latex articles.

The accompanying report on German medical, surgical and sundry rubber goods is one of several on the German rubber industry made by a mission of experienced technical representatives shortly after the fall of Germany. A similar report on the "Production and Performance of German Synthetic Tires" appeared serially in our August, September, October and November, 1945, issues. Two other reports have appeared in the "India Rubber World." The current report includes data on compounding and manufacture secured largely from the Continental and Phoenix plants. It was prepared by two members of the technical mission in cooperation with members of the industry and various government agencies concerned with rubber. As issued by the War Production Board, this report included general information on types of buna, compounding ingredients, heat softening, and legal aspects. This information was also given in the report on tires and therefore is not being repeated in the present report.

BUNA LATEX GLOVES

Buna SS Latex (45%)	79.86
Emulsion of Oil Softener	10.89
Dispersing material (like Darvan)	0.724
Colloidal Sulfur	0.45
MBTS	0.36
Active ZnO	1.815
China Clay	1.815
Aldol alpha-naphthylamine	0.18
Phen l beta naphthylamine	0.18
Yellow Dye	0.035
Black Dye	0.007
Red Dye	0.054
10% Solution of wetting agent	3.630
	100.000

It was said that the quality of these Buna latex gloves was entirely satisfactory for the purposes for which they are used.

Soft Sponge

Some samples of good quality soft Buna sponge were seen during the survey of the Limmer plant of Continental. This type sponge was used in Germany for seat cushions, bath sponges, and other places where a soft connected-cell sponge was useful. The formula used is as follows, and it was claimed that this blows to 10 times its uncured volume:

BUNA SPONGE

Buna SS (100 Defo)	14.7 Master-
Renacit II [1]	0.3 batch
Buna Scrap [2]	19.6 Master-
Renacit II	0.4 batch
Brown Factice	10.0
AK 77 [3]	5.0
Paraffine Oil	1.0
Paraffine	3.0
Aldol alpha naphthylamine	0.2
DOTG	0.2
Zinc Oxide (coarse)	2.0
Blanc Fixe	34.7
Titanium Dioxide	4.0
Orange Color	1.1
Sulfur	3.8
	100.0

(1) Chemical softener; (2) Ground and refined Buna scrap containing low quantity of filler; (3) 50/50 mixture of rosin and asphaltic softener.

The following is added at the end of mix: (a) 5 Kg solution of 16.67 parts by weight of ammonium bicarbonate in 83.33 parts by weight of water; (b) 5 Kg ethyl alcohol.

The two master batches are put in a hot room for several hours at 60° C. before mixing in order to produce soft, dead stock. A batch of approximately 50 Kg is mixed on a 60" mill. The mixture of ammonium bicarbonate solution and alcohol is added at the end of the mix. The mixed batch is stored under water at room temperature for two days. It is then put on a 60" mill with the rolls set tight and the mill gradually opened until the correct thickness of stock is obtained and a sheet can be taken off without air blisters.

Sheets of proper length and width are then cut from the slabs and are cold pressed with light hydraulic pressure to obtain a smooth surface and to expel any remaining trapped air. After pressing, the sheets are allowed to rest a few hours to recover a uniform thickness before going to the heater for cure.

The heater is equipped with steam coils and fitted for both steam and air pressure. The sheets are laid in the heater in open trays and 4 atmospheres of air pressure are applied. The temperature is raised to 115° C. by means of the steam coils and held for 1½ hours. The air pressure is then gradually removed and steam pressure of 1½ atmospheres is admitted to the heater and the cure completed in 1½ hours. While still hot, the sponge is "wrung out" through rubber-covered rollers.

Before the war natural rubber sponge was made by the same procedure as given above for Buna sponge. The following compound was used for orange red sponge, other compounds being similar except for the coloring materials:

DRY HEAT NATURAL RUBBER SPONGE

First Latex	34.0 Master-
PSC (I. G. chemical softener)	0.3 batch
First Latex	0.8 Master-
DOTG	0.2 batch
Aldol Alpha Naphthylamine	0.2
White Factice	10.0
Paraffine Oil	2.8
Ozokerite V	1.0
Zinc Oxide (coarse)	2.0
Blanc Fixe	40.5
Titanium Dioxide	4.0
Orange Color	1.0
Red Color	0.2
Sulfur	3.0
	100.0

The following is added at end of mix: (a) 5 Kg solution of 16.67 parts by weight of ammonium bicarbonate in 83.33 parts by weight of water; (b) 5 Kg ethyl alcohol.

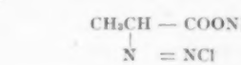
Molded Buna sponge of good quality was made at Limmer. Their manufacturing practice was similar to that used generally in the U. S. For molded sheets, fabric was used on both sides for venting, while for molded articles the molds were well vented to release the gases.

The Buna and natural rubber sponge compounds for sheets, molded cyclists' helmets, etc., are as follows:

MOLDED BUNA SPONGE

Buna S (300 Defo)	25.0 Master-
Naftolen	5.0 batch
Black P1250	10.0
Buna S (300 Defo)	5.0
Reclaim [1]	15.0
Naftolen	15.0
Ozokerite V	1.0
Phenyl beta naphthylamine	0.5
MBTS	0.2
DPG	0.2
Vulkacit AZ [2]	0.2
Zinc Oxide	4.0
Blanc Fixe	12.6
Sodium bicarbonate	2.4
Treibmittel N [3]	2.7
Sulfur (sifted)	1.2
	100.0

(1) Made from transparent natural rubber; (2) Similar to Santocure; (3) I. G. blowing agent which gives off nitrogen and carbon dioxide gas. It has the approximate formula:



NATURAL RUBBER SHEET AND MOLDED SPONGE

Sheets	49.2 Master-
Renacit II	1.0 batch
Factice [1]	6.0
Naftolen	4.0
Paraffine	1.0
Vaseline	2.0
Aktiplast [2]	2.0
4010 [3]	0.6
MBTS	0.2
DPG	0.6
Zinc Oxide (coarse)	4.0
Blanc Fixe	14.9
Magnesium Carbonate (light)	2.0
Lithopone	2.0
Tartaric Acid	1.0
Black CK IV	0.1
Sodium bicarbonate	8.0
Sulfur	1.4
	100.0

(1) Type not given; (2) Zinc salt of fatty acid, stearic substitute; (3) Antioxidant.

Cellular Hard Rubber

Information on the manufacture of cellular hard rubber was obtained at the Limmer plant. It was stated that this material, the thickness of which is 5/8", was used as coating for submarines to absorb the sound waves of detector devices.

Recently although manufacturing capacity was 8 tons per month, only 3 tons per month were being made. It was stated that this material had the defect of burning too easily, and therefore to counteract this, a substitute submarine coating was developed using hard cellular polyvinyl chloride.

None of the plant personnel knew for certain how much of the hard rubber sponge was actually used on submarines in addition to its use on hulls of ships, on buoys, etc. Apparently, manufacturers were not kept closely informed on the usages to which their products were put. The formula for cellular hard rubber is as follows:

CELLULAR HARD RUBBER

Buna SS (300 Defo)	65.0
Brown Factice	3.0
Plasticator RA [1]	3.0
Plasticator #32 [2]	3.0
Ozokerite	1.0
Phenyl beta naphthylamine	0.5
Stearic Acid	0.5
DPG	1.0
Sulfur (sifted)	23.0
	100.0

(1) Residue from ethylbenzene distillation; (2) Viscous sodium polymer of butadiene.

This compound is mixed in a 35 Kg batch on a 60" mill. The Buna SS is broken down first with the rolls very tight (1 mm opening) for three minutes. The oils and factice and wax are then added with the mill opened slightly and worked for 13 minutes. The mill is opened to 5 mms and everything added except the sulfur, the stock is cut twice from both sides and allowed to pass through the mill completely for a total of 14 minutes. Then the sulfur is added and the stock cut twice from both sides and end-passed three times for six minutes. The batch is taken off in five slabs, total of three minutes. Total mixing time, 39 minutes.

The stock is calendered to proper thickness and very tightly rolled on a small drum in tin foil with special type paper between the stock and the metal, the rolls being 800 cms. long and 200 cms. wide. An extra length of paper is wrapped around the tin at the end and given a special fold to hold the roll solid and tight. The rolls are then inserted in deep autoclaves and 300 atmospheres of nitrogen pressure applied. The autoclaves are heated with 3 atmospheres steam pressure which further builds up the nitrogen pressure to above 400 atmospheres. The length of cure is not fixed but must be determined by test specimens on each batch. This cure proceeds only until the stock vulcanizes to a fairly soft consistency.

After the proper amount of heating time, the autoclave is cooled very slowly, and the pressure is released. The rolls are unwound and the stock removed from the tin liner. The tin is used over and over again. When removed from the liner the stock swells very quickly but after cooling shrinks back again.

Next the stock is placed in a steam jacketed kettle and heated in boiling water for approximately 40 minutes which again swells the sponge, resulting in a resilient soft rubber cellular mousse. This soft rubber sponge is then cut to the proper size and given a final press cure so as to vulcanize it to cellular ebonite. The material is shipped out in sheet form.

The type of paper liner used is of great importance as this permits the gas to seep into the rubber between the tin layers. The investigators were advised that this process was not Continental's idea, but was used under license from the French patentees.

Catheters

In the period before the war, Germany exported to the United States many catheters, stomach tubes, and other rubber surgical goods. German catheters were of excellent finish and quality, and it was considered advisable, therefore, to obtain manufacturing details on these.

The two main catheter manufacturers in Germany were Rusch, located near Stuttgart, and Continental, Limmer. During the last two or three years, production of catheters was discontinued at Limmer and Rusch undertook it all, for purposes of production simplification. However, from personnel at Limmer it was possible to get all information on catheter production which is believed to be similar or identical to Rusch practice.

Continental made two types of catheters as represented by compounds 13602 and 13611, the former being of red color, which was more popular for the export trade, and the latter of a golden brown color, which was more popular in the home market. The quality of the 13611 compound was considered to be somewhat superior in aging and sterilizing characteristics to 13602. Compound 13602 for export catheters and stomach tubes follows:

COMPOUND 13602

Selected Pale Crepe (centers only)	38.0
Smoked Sheet (centers only)	1.6
DOTG	0.4
Brown Sub. (dry grade)	20.0
Aldol alpha naphthylamine	0.4
Sifted sulfur	1.3
Heavy Calcined Magnesia	1.0
Zinc Oxide (coarse)	3.0
Kieselgur (fine silica)	10.0
Kiesel kriede (amorphous)	7.3
China Clay	10.0
Red Antimony	7.0
	100.0

Mixing of 13602 Catheter Stock

60" Mill, 50 Kg batch	
Mill is set tight (1-2 mm) and Pale Crepe and DOTG is worked with constant cutting	6 min.
Mill is opened (5 mm.), rubber is dropped into pan and the factice is put through the rolls to break it up. Then rubber is put back on the mill, the factice worked in and the stock cut twice from each side and passed completely through the mill..	11 min.
All fillers except Sb_2S_3 added, worked in and stock cut through the mill once from each side	10 min.
Sb_2S_3 added, batch box cleaned out, mill pan brushed up. Stock cut through 4 times from each side	8 min.
Mill then tightened to 1 mm and stock passed through twice and rolled. Mill opened again to 5 mm, stock rolled twice from each side and end-passed. Batch cut off in six slabs, dipped and dusted...	10 min.
Total Time	45 min.

Compound for catheters and stomach tubes for domestic use follows:

COMPOUND 13611

Selected SS (centers)	40
Brown Sub. (dry grade)	28
Kieselgur (fine silica)	14
Golden Antimony	18
	100

Mixing of 13611 is similar to 13602.

Manufacture of Catheters (Both Types)

Stock is allowed to age at least 24 hours after mixing.

It is then tubed and laid in straight pans (not coiled) in a bed of sifted sulfur. The tubes are cut to approximate length directly from the tube machine.

The uncured tubes are allowed to lie in the sulfur *not less than four weeks* and *not over six weeks.*

The tube is carefully wiped with a dry cloth to remove all sulfur.

A small aluminum form is then inserted into the tubing just above the plug to form the "eye."

The tube with aluminum form is now inserted into a multiple-cavity aluminum forming mold to shape the tip and the eye around the aluminum form. The mold is clamped shut and is warmed for 10 minutes at 80°-90° C.

The extra stock squeezed out by the shaping mold is carefully washed off with solvent and the end lightly and carefully dusted with sulfur.

Within one hour the shaped tubing with aluminum form still in place is inserted in a plain glass mold. The tube is ½ filled with plain water and the top is then plugged in identical manner as was the tip. A small square of cloth sheeting is then placed over the top of the glass and tied down below the beaded portion with 3 or 4 wraps of string and tightly bound.

The glass molds are then put into a vulcanizer and cured:

15 min. rise to 3 atmospheres.
60 min. at 3 atmospheres.

Immediately after removal from the heater, the catheters are stripped from the glass and immediately placed under cold clean water.

Aluminum form for eye is then removed, funnel is trimmed, and catheter is stamped with size, etc.

Neither wax nor shellac is used to finish the catheter.

The glass molds are kept clean and clear by cleaning with concentrated nitric acid after every 15 or 20 cures.

Natural rubber has been permitted for catheter production in Germany up to the end. They had no satisfactory synthetic substitute. They claimed that all their Bunas were too irritating to human membranes to permit their use in catheters, stomach tubes or other rubber surgical items which were in close contact with the body. Tests made on Buna compounds showed that 10-15% of people tested would get rashes from them.

Pure Gum Surgical Tubing

In the period before the war, Germany exported to the United States pure gum transparent surgical natural rubber tubing which found considerable favor with hospitals and physicians due to its transparency, smoothness and accuracy of dimensions. The very small size pure gum tubings were particularly difficult to duplicate with normal American manufacturing methods. It was considered advisable to investigate the methods used at Continental (Limmer) for producing these products.

Since the war, production of pure gum tubing has been greatly curtailed in Germany, and such production as was permitted was transferred from Continental to Rusch (Stuttgart), the same as was done with catheter production. However, full information regarding Continental's methods of making these tubings was obtained from personnel at the Limmer plant who formerly had charge of its manufacture.

Method I: This method is particularly adapted to the very small, thin walled tubings which cannot be successfully extruded.

The centers of bales of specially selected, clean, clear smoked sheets were taken and given at least three successive millings with 24 hour intervals until the rubber was very soft. The rubber was then placed in steel cylinders and compressed with hydraulic pressure (100 pounds per sq. in.) to make a solid cylinder, entirely free from air bubbles.

These rubber cylinders were then frozen in a refrigerating machine especially installed for this purpose until bone hard, then were transferred to a cold room kept at 50° C. *for at least two months.*

At the end of this period the hard frozen cylinders of smoked sheet rubber were taken to a special veneering machine, similar to those used for making sheets of wood veneer from logs and a continuous sheet 1 mm. thick was cut from the cylinder. These sheets were then cut into narrow strips of proper width to make the desired size of tubings.

The smooth strips were then drawn through a die to form the tubing with the edges butted longitudinally. This edge butt was so accurately made and so nicely joined that it was not visible to the eye in the finished product.

From the forming die the tubing was drawn through a bath of sulfur chloride in carbon bisulfide, then neutralized, washed, and finally the tubing was completed.

Wall thicknesses of less than 1 mm. could easily be made by this method with tubing diameter practically as small as desired.

A very small rubber sleeve for the inside of tire valves was made in the same manner, in order to get accuracy of dimensions and complete smoothness of surface.

Method II: For pure gum tubing of larger diameters and thicker walls the glass curing method was employed. Ultra transparent stock was used:

First Latex Crepe	98.0
Stearic Acid	0.5
Pip-pip	0.3
V-774 (I. G. Accelerator)	0.2
Zinc Oxide (active)	1.0
	100.0

Mixing Procedure for Above

60" mill, 50 Kg batch

The centers of bales of specially selected clean, light colored pale crepe rubber were milled on a tight (1 mm.) mill with constant cutting and passing rubber completely through mill each time.....	15 min.
Mill opened to 5 mm. Stearic acid added and worked in. Then zinc oxide and accelerators are added. The stock is cut twice from each side and passed through. Then the batch box is cleaned out, the pan swept up and the stock again cut twice from each side. The stock is finally end-passed three times	9 min.
Mill closed to about 3-4 mm. and the batch cut off in 6 slabs. This batch is *not dipped*, and not dusted, but is hung and air cooled	5 min.
Total Time	29 min.

(Note: Yellow crayon only should be used for marking.)

After 24 hrs. the stock is tubed into straight pans and cut to approximately the desired length and is embedded and covered with sifted sulfur. The trays of tubing are then aged for *from four to six weeks.*

After this aging period the tubing is plugged at one end with a plug of the same compound and is inserted in the glass tube. The tubing is then half filled with water and the other end similarly plugged. Both ends are now tied down by lapping a piece of fabric sheeting over the ends of the glass and securely tying with cord.

Tubing is cured in a heater:

15 min. rise to 3 atmospheres
60 min. at 3 atmospheres

The tubing is removed from the glass directly after cure and placed in clean water. No finish is applied to the tubing.

The glass molds are kept clean and clear by immersing them in concentrated nitric acid after every 15 to 20 cures.

Sundry Rubber Goods

The personnel concerned with sundry items at Phoenix were questioned, and the portions of the plant devoted to the manufacture of sundries were inspected.

During the last two years, production of sundry items at Phoenix was limited to air cushions, water cushions, hot water bottles, ice bags, drainage and irrigation tubing, and rubber bulbs. They had previously manufactured play balls, football bladders, and various other sundry items out of natural rubber, but these were discontinued when the war started.

The air cushions, water cushions, hot water bottles, and ice bags were all made with Buna and one compound was used. This formula is as follows:

Buna S-3 (Defo 200)	15.00
Buna SS (Defo 800)	15.00
Red Reclaim (Natural Rubber)	20.00
Mineral Oil	4.00
Sulfur	1.00
Zinc Oxide	2.60
Vulcacit AZ (similar to Santocure)	0.60
MBT	0.60
Titanium Dioxide	4.00
Red Dye	0.06
Orange Dye	1.14
Kiesel kreide (Amorphous silica)	28.00
Blanc Fixe	8.00
	100.00

This stock was calendered in the sundries department—one meter wide—and for cushions was plied up to a thickness of 1.2 millimeters; for bottles, 1 mm; and for ice bags, 0.8 mm. The stock, as it came off the calender, was dusted with talc (they had previously used zinc stearate, but this was no longer available).

Pieces were stamped out on a clicking machine to the proper shape and these items were then hand-built using one coat of cement made with L 1914/4 stock, the solution being approximately 1 lb. stock to 8 lbs. of a mixture of gasoline and benzol, depending upon the availability of these solvents. The joints were made in the standard manner, the same as had been done with natural rubber, and a 0.7 mm. reinforcing strip of the same stock placed over the joints and rolled down by hand.

For the hot water bottles a brass or white metal closure was given one wrap with the same compound, with no cement, placed inside the neck of the uncured bottle and wrapped with a small piece of fabric for the cure only.

The bottle was then placed on a ½ inch bed of soapstone and these were stacked in the heater and cured for 20 minutes in hot air at 120° C. and then for 15 minutes with steam at 143° C.

After curing, the neck was wrapped securely with wire in order to hold the metal closure in place and to keep it from leaking.

These are the only types of hot water bottles that have been made in Germany since the war, manufacture of molded hot water bottles and similar items being "verboten."

Formula for L 1914/4 follows:

Buna SS (Defo 800).....	32.0
Mineral Oil	22.4
Sulfur	1.0
Zinc Oxide	3.0
MBT	0.4
Vulcacit AZ (Similar to Santocure)	0.4
Orange Dye	0.2
Red Oxide	0.4
Titanium Dioxide	0.8
Aluminum Hydroxide	16.0
Natural Whiting	23.4
	100.0

Syringe bulbs are made on the same type forming machine as is commonly used in the United States for manufacture of bulbs, play balls, etc., and in order to operate this machine successfully it is necessary to use Buna SS (high styrene softened to a Defo number of 200 or less). This stock follows:

SYRINGE BULBS

Buna SS (Defo 200)	32.0
Red Reclaim (Nat. Rubber)	16.0
Light Factice (S_2Cl_2 type)	8.0
Mineral Oil	6.0
Sulfur	1.2
Zinc Oxide	3.0
Red Dye	0.2
Orange Dye	1.8
Vulcacit AZ	0.6
MBT	0.6
Lithopone	2.6
Natural Whiting	28.0
	100.0

Ammonium nitrite pellets are used to cure the bulbs for internal pressure. The cure time is 30 minutes at 4 atmospheres or 150° C., the press being cooled after each heating. These Buna bulbs are considered satisfactory for the purpose but are not as resilient or as serviceable as the natural rubber bulbs made before the war.

(Continued on Page 351)

Influence of Polar Compounds on Hydrated Calcium Silicate and GR-S Vulcanizates

By F. W. GAGE

Pittsburgh Plate Glass Co., Columbia Chemical Div., Barberton, Ohio

HYDRATED calcium silicate (*1*) has long been recognized as an outstanding non-carbon black reenforcing pigment for GR-S. At relatively high loadings it produces stiff, hard, tough stocks possessing good abrasion resistant qualities. At lower loadings its vulcanizates are characterized by good tear resistance and excellent heat and aging resistance. These properties make hydrated calcium silicate a superior pigment for many applications for which these properties are required.

However, hydrated calcium silicate has one characteristic which has prevented its being accepted as a universal reenforcing pigment for GR-S. Vulcanizates containing hydrated calcium silicate are characterized by relatively high hysteresis and especially high heat build-up. This is particularly true at the higher loadings at which the maximum reenforcing properties of this pigment are obtained. This is illustrated in Table I, in which the heat build-up of a GR-S vulcanizate containing 30 volumes of hydrated calcium silicate is compared with that of a similar vulcanizate containing 30 volumes of carbon black. These tests were run on test pieces cured for 60 and 90 minutes at 280° F. The heat build-up was measured by means of a Goodrich Flexometer, using a 0.175 inch stroke and a load of 175 lbs. per sq. inch.

(1) Silene EF.

(2) Braendle, H. A., and Wiegand, W. B., *Ind. Eng. Chem.*, Vol. 36, p. 724 (1944).

(3) Rupert, F. E., and Gage, F. W., *Ind. Eng. Chem.*, Vol. 37, p. 378 (1945).

(4) Pittsburgh Plate Glass Co., Unpublished Data.

TABLE I — COMPARISON OF HEAT BUILD-UP OF HYDRATED CALCIUM SILICATE AND CARBON BLACK GR-S VULCANIZATES

	A	B
GR-S	100.0	100.0
Hydrated Calcium Silicate	66.9	....
EPC Carbon Black	....	55.7
Zinc Oxide	5.0	5.0
Pine Tar	5.0	5.0
Bardol	5.0	5.0
Sulfur	3.0	2.0
Santocure	1.0	1.2
Phenyl-Beta-Naphthylamine	1.0	1.0

Minutes Flexing	Stock A 60 Min. (° F.)	Stock A 90 Min. (° F.)	Stock B 60 Min. (° F.)	Stock B 90 Min. (° F.)
3	64*	49	58	56
6	87	76	77	72
12	112	96	86	77
20	125	104	89	79

* Degrees rise above 100° F.

TABLE II—HEAT BUILD-UP OF HYDRATED CALCIUM SILICATE GR-S VULCANIZATES EMPLOYING SPDX-G AS THE ACCELERATOR

	C	D
GR-S	100.0	100.0
Hydrated Calcium Silicate	66.9 (30 vol.)	89.2 (40 vol.)
Zinc Oxide	5.0	5.0
Light Processing Oil	5.0	5.0
Sulfur	3.5	3.5
SPDX-G	1.3	1.3
Phenyl-Beta-Naphthylamine	1.0	1.0

Minutes Flexing	Stock C 60 Min. (° F.)	Stock C 90 Min. (° F.)	Stock C 150 Min. (° F.)	Stock D 60 Min. (° F.)	Stock D 90 Min. (° F.)	Stock D 150 Min. (° F.)
3	116*	85	59	143	115	81
6	131	124	87	147	140	120
12	137	129	100	164	147	128
20	140	131	102	173	150	128

* Degrees rise above 100° F.

Similarly, when using a non-persistent type of accelerator, the heat build-up of hydrated calcium silicate GR-S vulcanizates is high, as is illustrated in Table II. The results of these tests indicate that with the ordinary type of compounding the heat build-up of hydrated calcium silicate GR-S vulcanizates is much too high to permit their use where they would be subjected to dynamic flexing. Attempts to reduce the heat build-up through modification of sulfur and accelerator ratios met with little success, since even small reductions obtained in this manner were accompanied by undesirable changes in other physical properties. Similarly, a study of plasticizers demonstrated that some other means would have to be found to correct this shortcoming of hydrated calcium silicate GR-S vulcanizates.

Such a means has now been found. Earlier work (*2, 3*) had shown that moisture plays an important role in GR-S tread compounding, having a marked effect on the rate of cure and to a limited extent on the hardness and stiffness of the stock. This was even more pronounced in GR-S vulcanizates containing hydrated calcium silicate (*4*). As a result of this, research was initiated to investigate the effect of water added to such

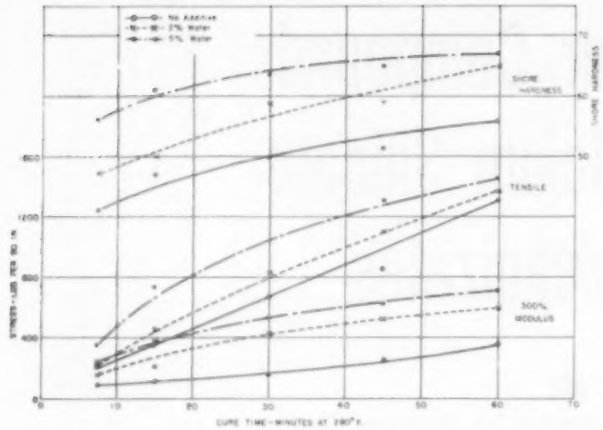


FIG. 1—Effect of water on the modulus, tensile and hardness of hydrated calcium silicate GR-S vulcanizates.

stocks during mixing on their heat build-up. The results of this investigation were quite striking. Water, when added to GR-S and hydrated calcium silicate stocks, gives a considerably faster rate of cure and leads to the production of vulcanizates having higher moduli, tensiles, and hardness, as well as greatly reduced heat build-up. The effect of water on the heat build-up, rate of cure, hardness, and stress-strain properties of the vulcanizates is illustrated by tests on the series of stocks shown in Table III. Results of these tests are given in Table III and in Figures 1 and 2.

TABLE III — EFFECT OF WATER ON THE PHYSICAL PROPERTIES OF HYDRATED CALCIUM SILICATE GR-S VULCANIZATES

	E	F	G
GR-S	100.0	100.0	100.0
Hydrated Calcium Silicate	66.9	66.9	66.9
Zinc Oxide	5.0	5.0	5.0
Light Processing Oil	5.0	5.0	5.0
Sulfur	3.5	3.5	3.5
SPDX-G	1.3	1.3	1.3
Phenyl-Beta-Naphthylamine	1.0	1.0	1.0
Water	....	2.0	5.0

Stock	Cure at 280° F. (min.)	Modulus at 300% (psi.)	Tensile at Break (psi.)	% Elongation at Break	Shore Hardness	Heat Build-Up* (° F.)
E	7.5	85	199	705	41	...
	15	113	340	645	47	...
	30	156	666	690	50	...
	45	255	851	645	51	...
	60	355	1305	670	56	151
	90	...	....	...	..	139
F	7.5	156	227	500	47	...
	15	213	383	480	50	...
	30	411	837	555	59	...
	45	525	1106	520	59	...
	60	596	1375	500	65	128
	90	...	....	...	..	96
G	7.5	255	355	425	56	...
	15	454	737	475	61	...
	30	539	1049	520	64	...
	45	624	1305	510	65	...
	60	709	1461	495	67	112
	90	...	....	...	..	90

* Degrees rise above 100° F. after 20 min. flexing.

Water is quite volatile and the amount retained by the GR-S stocks during milling difficult to control. Attention was therefore directed to other polar compounds less volatile than water and whose addition

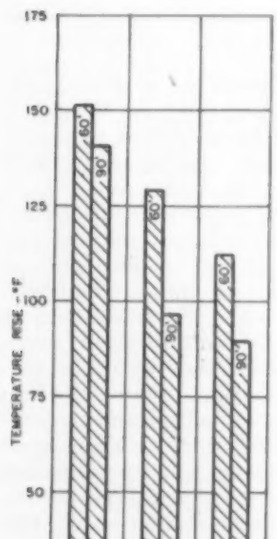


FIG. 2—Effect of water on the heat build-up.

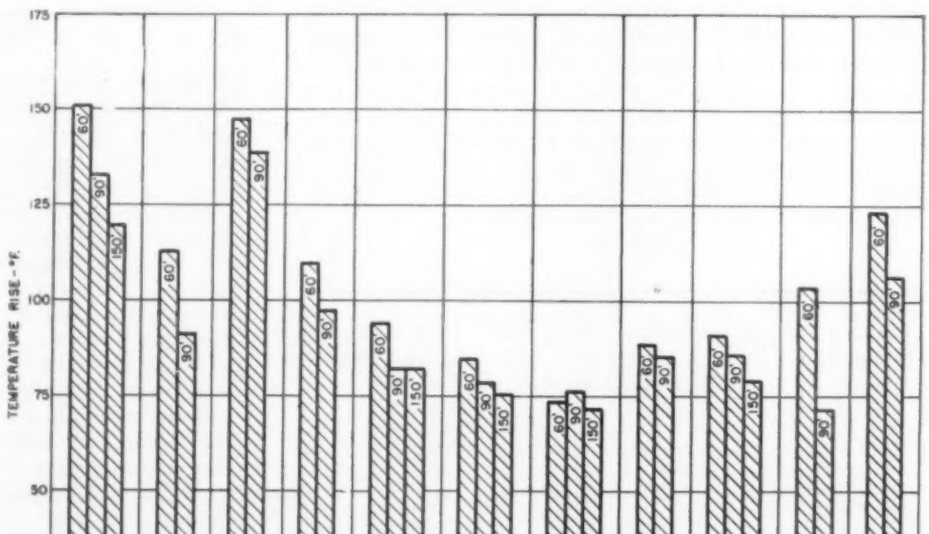


FIG. 3—Effect of certain polar compounds on the heat build-up of hydrated calcium silicate GR-S vulcanizates.

could be more readily controlled. A number of compounds of this type were investigated. Results of tests of the more representative materials are given in Table IV and Figure 3. These tests were all made on vulcanizates prepared from stocks having the same base formula as Stock E (see Table III).

These data show that while the monohydroxy compounds have only relatively minor effects on the hydrated calcium silicate GR-S vulcanizates the polyhydroxy compounds are even more effective than water. The effect of these polyhydroxy compounds is still more striking when one considers that the amount added is less than one-eighth of the molecular equivalent of 5% water. The addition of all the hydroxy compounds was on an equimolecular basis with 2% ethylene glycol. Four percent ethylene glycol is

TABLE IV—EFFECT OF CERTAIN POLAR COMPOUNDS ON THE PHYSICAL PROPERTIES OF HYDRATED CALCIUM SILICATE GR-S VULCANIZATES

Additive	Cure at 280° F. (min.)	Modulus at 300%, psi.	Tensile at Break, psi.	% Elong. at Break	Shore Hard.	Heat Build-Up * (° F.)
None	15	170	298	505	48	...
	30	369	596	490	53	...
	60	624	1276	530	62	151
	90	....	....	....	..	132
	120	936	1531	435	68	...
	150	....	....	....	..	119
5% Water	15	454	737	475	61	...
	30	539	1049	520	64	...
	60	709	1461	495	67	112
	90	....	....	....	..	90
4.2% Octyl Alcohol	15	99	695	810	44	...
	30	184	1064	750	48	...
	60	298	1375	665	55	147
	90	....	....	....	..	138
5.2% Butyl Carbitol	15	241	978	690	50	...
	30	312	1262	670	53	...
	60	425	1390	560	57	109
	90	....	....	....	..	97
2% Ethylene Glycol	15	539	1064	485	59	...
	30	766	1475	480	61	...
	60	1049	1461	380	66	94
	90	1141	1418	325	71	81
	150	....	....	....	..	81
4% Ethylene Glycol	15	610	1276	525	62	...
	30	1021	1631	475	67	...
	60	1234	1687	465	73	84
	90	1375	1531	345	76	78
	150	....	....	....	..	75
3.4% Diethylene Glycol	15	837	1503	460	65	...
	30	1049	1475	405	66	...
	60	1290	1546	350	69	73
	90	1375	1446	320	72	76
	150	....	....	....	..	71
2.5% Propylene Glycol	15	411	1446	645	59	...
	30	496	1574	590	59	...
	60	596	1446	480	63	88
	90	....	....	....	..	85
3.0% Glycerol	15	567	1333	530	..	...
	30	808	1645	475	..	...
	60	1078	1361	370	..	90
	90	1191	1461	355	..	85
	150	....	....	....	..	78
3.9% Ethylene Diamine	15	468	893	480	59	...
	30	709	1049	475	65	...
	60	950	1064	325	68	102
	90	....	....	....	..	71
	120	1020	1134	305	73	...
3.9% Mono Ethanolamine	15	326	780	550	56	...
	30	553	1163	500	64	...
	60	752	1446	460	69	123
	90	....	....	....	..	105
	120	964	1361	385	74	...

* Degrees rise above 100° F. after 20 min. flexing.

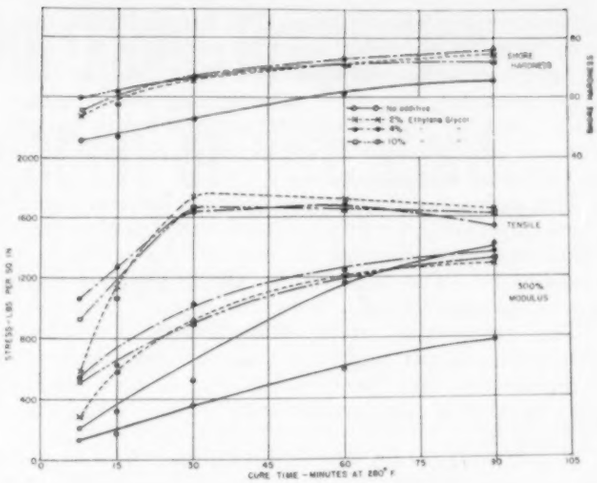


FIG. 4—Effect of varying amounts of ethylene glycol on the modulus, tensile and hardness of hydrated calcium silicate GR-S vulcanizates.

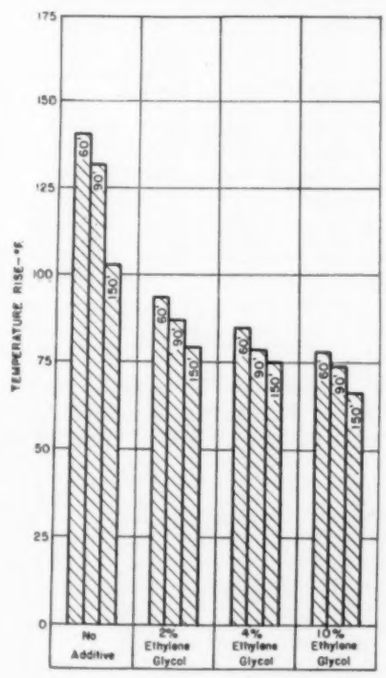


FIG. 5 — Effect of varying amounts of ethylene glycol on the heat build-up of hydrated calcium silicate GR-S vulcanizates.

somewhat more effective than 2%, but further increase does little to alter the physical properties. This is brought out in Figures 4 and 5. The same base formula (Stock E) was used in preparing these vulcanizates. It is of importance to note that tensile properties are somewhat increased through the addition of polyhydroxy compounds.

The amino compounds also have an influence on the physical properties of the vulcanizates, but the overall effect is not as positive as that of the polyhydroxy compounds. The addition of the amino compounds was on an equimolecular basis with 4% ethylene glycol.

This remarkable effect obtained with polyhydroxy compounds is not limited to vulcanizates cured with non-persistent type accelerators, but is also obtained with persistent type accelerators. This is illustrated in Table V.

It will be observed that with this type of accelerator the addition of 4% ethylene glycol increases the rate of cure appreciably, the same state of cure being attained in 15 minutes with Stock H that requires 60 minutes with Stock A. As in the case of vulcanizates cured with a non-persistent accelerator the tensile properties are increased and the heat build-up is appreciably reduced through the addition of ethylene glycol.

When hydrated calcium silicate GR-S vulcanizates are aged for 48 hours at 100° C. the moduli and hardness increase somewhat and the tensile strengths remain about the same as they were before aging. The age resistance of vulcanizates of stocks containing ethylene glycol, as measured by this test, does not differ appreciably from that of vulcanizates of stocks not containing ethylene glycol. This is indicated by the data in Table VI.

The addition of ethylene glycol to the hydrated calcium silicate GR-S stock does not have any effect on the resilience of the vulcanizates as measured with a Bashore Resiliometer. This is demonstrated in Table VII.

The flex life of hydrated calcium silicate GR-S vulcanizates is quite good, comparing very favorably with carbon black GR-S vulcanizates. While the addition

(Continued on Page 351)

TABLE V—EFFECT OF ETHYLENE GLYCOL ON THE PHYSICAL PROPERTIES OF A HYDRATED CALCIUM SILICATE GR-S VULCANIZATE EMPLOYING SANTOCURE AS THE ACCELERATOR

	H
GR-S	100.0
Hydrated Calcium Silicate	66.9
Zinc Oxide	5.0
Pine Tar	5.0
Bardol	5.0
Sulfur	3.0
Santocure	1.0
Phenyl-Beta-Naphthylamine	1.0
Ethylene Glycol	4.0

Stock	Cure at 280° F. (min.)	Modulus (psi.) 300%	500%	Tensile at Break (psi.)	% Elong. at Break	Shore Hard.	Heat Build-Up* (° F.)
A	20	156	482	1177	745	51	...
	30	241	652	1191	665	55	...
	60	383	993	1092	515	60	125
	90	411	1049	1092	510	61	104
	120	468	....	964	490	63	...
H	10	227	638	1375	705	55	...
	15	369	950	1305	580	59	...
	30	425	1191	1219	505	61	...
	60	482	....	1021	475	62	87
	90	468	....	1149	485	62	78

* Degrees rise above 100° F. after 20 min. flexing.

TABLE VI—EFFECT OF ETHYLENE GLYCOL ON THE OVEN AGING OF HYDRATED CALCIUM SILICATE GR-S VULCANIZATES AT 100°C. FOR 48 HRS.*

Stock	Cure at 280° F. (min.)	Modulus at 300% (psi.)	Tensile at Break (psi.)	% Elong. at Break	Shore Hardness
A	20	482	1361	595	66
	30	596	1191	490	69
	60	752	1106	415	73
	90	709	1106	415	73
	120	723	978	390	72
H	10	510	1446	580	67
	15	638	1248	465	71
	30	709	978	345	73
	60	752	1035	385	76
	90	752	1078	400	75

* See Table V for properties of stocks before aging.

TABLE VII—REBOUND RESILIENCE OF HYDRATED CALCIUM SILICATE GR-S VULCANIZATES

Stock	*Cure at 280° F.*	*% Rebound*
A	60 Min.	46
	90 Min.	47
H	60 Min.	46
	90 Min.	47

TABLE VIII—FLEX LIFE OF HYDRATED CALCIUM SILICATE AND CARBON BLACK GR-S VULCANIZATES

Stock	*Flex Life*
A	64,000
B	40,500
H	54,000

TABLE IX—EFFECT OF ETHYLENE GLYCOL ON THE PHYSICAL PROPERTIES OF HYDRATED CALCIUM SILICATE GR-S STOCKS COMPOUNDED WITH COUMARONE-INDENE RESIN

	I
GR-S	100.0
Hydrated Calcium Silicate	66.9
Coumarone-Indene Resin	15.0
Zinc Oxide	5.0
Sulfur	3.0
Santocure	1.5
Phenyl-Beta-Naphthylamine	1.0
Ethylene Glycol	4.0

Stock	Cure at 280° F. (min.)	Modulus (psi.) 100%	300%	Tensile at Break (psi.)	% Elong. at Break	Shore Hard.	Heat Build-Up* (° F.)
			Unaged				
I	15	184	610	2099	565	65	...
	30	170	709	2226	525	69	...
	45	184	709	1985	505	69	...
	60	199	723	2070	495	70	...
	90	...	...	...	...	...	76
	120	184	737	2042	490	71	...
			Aged 48 Hours at 100° C.				
I	15	440	1120	1787	435	79	...
	30	496	1191	1900	415	78	...
	45	468	1120	1773	435	80	...
	60	496	1191	1872	420	79	...
	120	482	1149	1461	365	79	...

* Degrees rise above 100° F. after 20 min. flexing.

Relationships of Cotton Fiber Properties to Strength and Elongation of Tire Cord

By ROBERT W. WEBB and HOWARD B. RICHARDSON

Cotton and Fiber Branch, U.S. Department of Agriculture, Washington, D.C.

A broad study on the relationships of cotton fiber properties to manufacturing performance and to the quality of manufactured properties was undertaken some time ago by the Department of Agriculture. The findings, covering a wide range of growth conditions and fiber properties, were issued in two separate reports, i. e., "Relationships Between Properties of Cotton Fibers and Strength of Carded Yarns" and "Relationships of Cotton Fiber Properties to Strength and Elongation of Tire Cord." Copies of these reports, both of them comprehensive in nature, can be secured from the authors listed above. Because of the importance of the latter report to the tire manufacturing field, we are reproducing herewith the summary and conclusions which appear in the report itself.—EDITOR.

BY USING multiple, partial, and simple correlation analyses, comprehensive studies have been made of the relationship and the contribution of a number of cotton fiber properties, separately and in various combinations, to the strength of 23/5/3 carded tire cord, to the percentage of elongation of such tire cord at the 10-pound load, and to the percentage of elongation at the point of rupture.

The fiber properties included are upper quartile length, coefficient of length variability, strength, fineness, percentage of mature fibers, and grade. Mean fiber length and staple length also have been considered in connection with tire-cord strength.

A coefficient of multiple linear correlation of 0.920 has been found for the relationship existing between the strength of the tire cord and the six collective fiber properties. This is relatively high, 84.6 percent of the total variance in the tire-cord strength of these cottons being accounted for by the fiber properties considered.

Essentially the same high correlation has been found for the relationship between the tire-cord strength and the four collective fiber properties of strength, fineness, coefficient of length variability, and grade as was obtained with the six fiber properties. The total variance in tire-cord strength explainable by those four fiber properties is 84.5 percent.

With other combinations of fiber properties, the coefficients of correlation are less and the amount of explainable variance in tire-cord strength is reduced.

The results of simple correlation analyses indicate relatively low or poor correlation between any one of the fiber properties and tire-cord strength. The fiber properties, however, vary considerably in this particular.

The fiber properties rank in order of importance to tire-cord strength, as follows: Fiber strength, coefficient of length variability, grade of cotton, fiber fineness, percentage of mature fibers, and upper quartile length. The contribution of the percentage of mature fibers and of upper quartile length to tire-cord strength is statistically insignificant.

When expressed in practical units of measure, as based on the six fiber-property equation, the average effect of change in each fiber property on the strength of 23/5/3 tire cord, while the other fiber properties are held constant, has been found to be as follows: Lowering the grade of cotton by one grade, decreases the strength of 23/5/3 tire cord by 0.30 pound; an increase of 1/32 inch in upper quartile length, causes no significant change in such cord strength; an increase of 1 percent in the coefficient of length variability, decreases the cord strength by 0.23 pound; an increase of 1 microgram per inch in fiber weight, decreases the cord strength by 0.76 pound (the coarser the fiber, the weaker the cord); an increase of 1 percent in the percentage of mature fibers, produces practically no effect on the cord strength; and an increase of 1,000 pounds per square inch in fiber strength, increases the cord strength by 0.18 pound.

The foregoing results, expressed in another manner, show that an increase of 1 pound in the strength of 23/5/3 tire cord follows by raising the grade of cotton by 3¼ steps; by decreasing the coefficient of length variability by 4.42 percent; by decreasing the fiber weight per inch by 1.32 micrograms (the finer the fiber, the stronger the cord); or by increasing the fiber strength by 5,600 pounds per square inch.

Twenty-three regression equations have been developed from which estimated strength of 23/5/3 tire cord may be predicted on the basis of one or more fiber properties. The precision of each of these equations is reported, together with the coefficients of correlation and determination.

The best estimating equation is that involving all six fiber properties. This equation has a precision indicating that, in two-thirds of the cases, the estimate can be expected to be within ± 0.78 pound of the actual cord strength. The result compares with ± 1.21 pounds for the best one fiber-property equation involving fiber strength.

As shown by the results from analyses involving fewer than six fiber properties, grade of cotton, percentage of mature fibers, and upper quartile length may be omitted from the regression equation without any appreciable loss of accuracy of estimates or predictions.

Supplementary equations have been derived from analyses of the 25 shortest cottons in the series, the 25 longest, and the 30 having practically equal fiber

strength, in an effort to study further the effect of fiber length on the strength of tire cord. The results obtained confirm the previous findings, namely, that fiber length is of little or no importance, as such, to tire-cord strength. It should be emphasized, however, that as a practical matter, fiber length as determined by laboratory methods and, more particularly, staple length as designated by the classer provide an essential basis for the selection of cottons to meet the requirements of specific roll settings and drafts in manufacturing organizations. In addition, staple length serves as a useful basis for the selection of cottons for tire cord and other uses because of the fact that other fiber properties, such as fiber fineness and tensile strength, are generally associated with fiber length.

Gives Continuity to Cotton Fibers

In the light of the evidence presented, it would appear that the "ply-and-cabled" construction of tire cord gives, in effect, continuity to the cotton fibers composing it and thereby eliminates practically any opportunity for fiber lengths, per se, to make an appreciable contribution to the strength of tire cord, as in the case with single cotton yarns. When an increase in tire-cord strength accompanies an increase in upper quartile length or staple length, as frequently is the case, it is due to an associated increase in fiber fineness or fiber strength, or both, rather than to the increase in fiber length itself.

None of the equations involving separate fiber properties gives estimates of tire-cord strength precise enough to put much reliance in results obtained on the basis of any one fiber property alone.

The equations reported in reference to the strength of 23/5/3 tire cord are based on methods of either linear multiple or simple correlation analyses. However, the interpretations made are considered reliable, since studies involving methods of curvilinear correlation analyses failed to reveal any improvement over the high correlation ($R = 0.920$) found by regular linear correlation methods to exist between tire-cord strength and the fiber properties considered.

A relatively high positive correlation has been found to exist between the strength of tire cord and the skein strength of 23s single carded yarns, representing the respective cottons spun with optimum twist multipliers in relation to their staple lengths. The coefficient of correlation is ± 0.897, and 80 percent of the total variance in the tire-cord strength from this series of cottons may be explained by yarn strength.

An equation is given for estimating the strength of tire cord from only a knowledge of the strength of single yarn. The equation indicates that an increase of 1 pound in the strength of 23s yarn increases the strength of 23/5/3 tire cord by 0.123 pound or approximately ⅛ pound. On the basis of the standard error for this equation, the estimated strengths of such tire cord would be expected to fall within ± 0.87 pound of the actual values in approximately two-thirds of the cases.

A coefficient of multiple linear correlation of 0.679 has been found for the relationship between the percentage of tire-cord elongation at the 10-pound load and the six fiber properties considered. This is relatively low, only 46 percent of the total variance in this tire-cord elongation being explained by the fiber properties.

About as high a correlation has been found for the relationship between a tire-cord elongation at the 10-pound load and the two fiber properties of fineness and strength, as was previously obtained with the six other properties.

The results of simple correlation analyses indicate relatively low or poor correlation between any one of the fiber properties and tire-cord elongation at the 10-pound load. Three of the six simple coefficients are statistically insignificant, namely those for percentage of mature fibers, grade and coefficient of length variability.

According to the partial correlation coefficients, only two fiber properties significantly affect tire-cord elongation at the 10-pound load. Ranked in order of importance they are fiber strength and fiber fineness.

Similar studies have been made of the percentage of elongation of tire cord at the point of rupture in relation to the fiber properties. The over-all correlation is a little less than that at the 10-pound load.

According to the partial correlation coefficients, four fiber properties significantly affect tire-cord elongation at the point of rupture. Listed in order of importance, they are as follows: Fiber strength, fiber fineness, coefficient of length variability, and grade.

Although the correlation coefficients based on linear relationships between the six fiber properties and tire-cord elongation at the 10-pound load, as well as at the point of rupture, are relatively low, no indication of any higher values was obtained when curvilinear analysis was applied to the data.

In the light of the findings obtained, it would appear that tire-cord elongation is due either to some one or more fiber properties not considered in these analyses —as fiber elongation and elasticity—or else that elongation is more a function of the construction of tire cord than it is of fiber properties.

A small but significant negative relationship occurred between the strength of this tire cord and percentage of elongation at the 10-pound load. An insignificant positive relationship, however, appeared between tire-cord strength and elongation at the specific point of rupture.

Each increase of 1 percent in tire-cord elongation at the 10-pound load is associated with a reduction of 0.58 pound in tire-cord strength; and each increase of 1 percent in the tire-cord elongation at the point of rupture is associated with an increase of only 0.08 pound in tire-cord strength.

Negative Relationship Revealed

Correlation analyses reveal an insignificant negative relationship between tire-cord elongation at the 10-pound load and skein strength of 23s carded single yarns, representing the respective cottons spun with optimum twist in relation to their staple lengths. On the other hand, a small positive but significant relationship has been found to exist between tire-cord elongation at the point of rupture and the strength of such singles yarn.

In considering the equations, statistical values, and conclusions presented, it should be understood that they refer only to one construction of tire cord, namely 23/5/3, and only to American upland cottons. What the results would be from similar analyses with other constructions of tire cord, of which there are many varied and specialized types, or with other growths of cotton, is problematical.

Making Flexible Molds from Neoprene Latex

By H. H. ABERNATHY and R. H. WALSH

Rubber Chemicals Division, E. I. duPont de Nemours & Co., Inc., Wilmington 98, Delaware

SMALL statuary, novelties, and plaques of simple or complex design may be reproduced most conveniently through the use of flexible molds made of rubber or synthetic rubber. Such molds are usually made in one piece and their flexibility minimizes difficulties with undercuts and sharp angles. Latex is the best source of rubber or synthetic rubber because relatively thick films may be deposited over the surface of an article in a very short time. Further, suitably prepared latex is readily available and expensive or complicated equipment is not required for its use.

Neoprene latex serves especially well for this purpose because films from it have very good heat, oil, and abrasion resistance. Neoprene molds reproduce fine lines and detail fully as well as does rubber. They may be used for casting at temperatures up to 300°F. and possibly higher. This permits the use of low melting alloys. The life of neoprene molds is exceptional.

Preparing the Latex

It is necessary to compound neoprene to obtain best results. The following dry basis recipes are typical:

TYPICAL COMPOUNDS

	A	B
Neoprene from Type 571 Conc. Latex	100.0	100.0
Zinc Oxide	25.0	25.0
Neozone D	3.0	3.0
Natural Whiting	30.0	150.0
Aquarex D	1.5	1.5
25 cps. Methyl Cellulose	....	1.0

FIG. 1—Object to be duplicated.

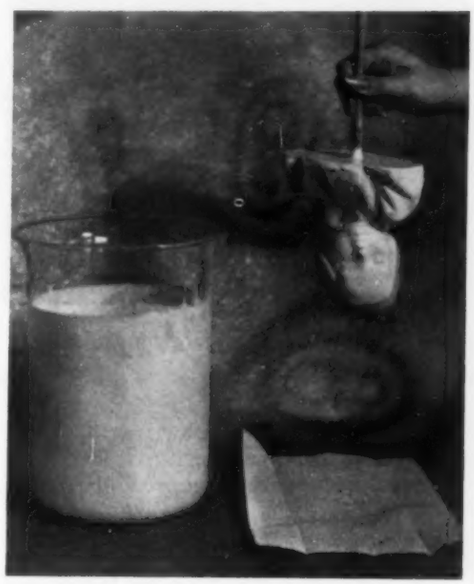


FIG. 2—Building up the film.

These compounds may be prepared in the conventional manner. Convenient recipes for dispersing the insoluble materials in water are shown below:

MASTER DISPERSIONS

	55% Solids For Compound A	60% Solids For Compound B
Zinc Oxide	250.0	250.0
Neozone D	30.0	30.0
Natural Whiting	300.0	1500.0
10% Dispersing Agent Solution	232.0	712.0
10% Waterglass	15.0	45.0
Distilled or Soft Water	228.0	317.0

These dispersions may be ground in a colloid mill 20 to 30 minutes or a pebble mill 24 to 48 hours. Any convenient non-foaming dispersing agent may be used. The Aquarex D and methyl cellulose are added as a 10% aqueous solution. In preparing the compounds, the Aquarex D is added to the latex first. If methyl cellulose is used, it may be stirred into the master dispersion before adding to the latex. The latex compound may be thinned if desired by adding distilled water or the compound may be thickened by adding more methyl cellulose

The latex compound should be allowed to stand before using until air bubbles come to the surface and can be removed. Very thick compounds may be rendered air free by allowing them to stand under vacuum.

FIG. 3—Applying cotton flock.

The above compounds are but two of an almost infinite variety of mixtures which may be used. Very satisfactory ready-prepared neoprene latex mixtures may be purchased from various suppliers of compounded latex.

Preparing the Article for Duplication

After the latex compound has been prepared or purchased, the object to be duplicated (see Figure 1) is prepared for dipping by providing it with a suitable handle or small wire attachment to suspend it in the latex.

Plaster or oxychloride cement molds may be lightly waxed to prevent the latex film from adhering too tightly. Metal molds should be clean and smooth surfaced. Rough metal may be very lightly waxed. Wooden molds are usually unsatisfactory due to the effect of moisture and because latex adheres tightly to wood. Painted and lacquered wooden molds may sometimes be used. Glass or porcelain molds should be cleaned thoroughly before using.

Forming the Flexible Mold

As the first step, the article is dipped into the compounded latex and held for 1 or 2 minutes and withdrawn. The excess latex is allowed to drain and the film is air or oven dried at low temperatures until it is firm. This operation is repeated until a film thickness of 0.03 to 0.1 inch, depending on the size of the mold, is produced. This operation is illustrated by Figure 2. Film thickness may be more rapidly built up if the coagulating dip processes* are used. A typical procedure is outlined below:

1. Dip into latex, withdraw slowly, invert the form if possible to smooth the adhering film.

2. Immediatly dip into a coagulant such as the following one:

Parts by Weight

Calcium Nitrate Tetrahydrate	20.0
Methanol	80.0

3. Withdraw from the coagulant and allow to dry until the surface is no longer shiny and very wet.

4. Dip again into the latex and hold until the necessary thickness is deposited (5 to 30 minutes). Alternatively, the form may be dipped into the coagulant first and then into the latex and this procedure repeated until the desired thickness is obtained.

5. Withdraw from the latex—if reinforcement of the neoprene is to be applied it should be started at this point—if not, the form should again be dipped briefly into the coagulant.

6. As the final step, the form coated with neoprene is rinsed, leached for 4 hours in tepid water, dried overnight at room temperature plus 2 to 6 hours at 170°F. in air, and vulcanized 30 minutes at 284°F. If lower vulcanization temperatures are used, longer times should be used; for instance, 90 minutes at 240°F. It is not always necessary to vulcanize molds of relatively simple design, but unvulcanized molds are more easily distorted than vulcanized ones.

Reinforcement of the Mold

After the original film on the form is made, its stiffness and thickness may be increased as desired by covering it with cotton flock which has been thoroughly wet down with either one of the typical compounds shown. The cotton flock paste may be applied by hand or by spatula (see Figure 3) during Step 5 in the process as outlined above. Figure 3 illustrates spatula

FIG. 4—Mold ready for drying.

* Coagulating dip processes are the subject of patents held by the American Anode Company and the U. S. Rubber Company.

application. The mold, thus reinforced, is allowed to dry for several days at room temperature before use. The cotton flock coating makes long drying necessary, particularly if the mold is to be vulcanized as outlined in Step 6 above. A completed mold ready for drying and vulcanizing is shown in Figure 4. Reinforced molds are not easily distorted but the cotton flock reinforcement may crack if bent at very sharp angles unless the cotton flock has been thoroughly wet down and mixed with latex.

Final Steps to Complete Mold

Finally, the mold is cut off the form, using a sharp rubber cutting knife or other suitable cutting tools. Usually it is necessary to slit only one side of the mold covering. Figure 5 illustrates a completed mold which has been slit along two sides. Care should be taken in slitting to see that the edges of the cut are smooth and will fit tightly together. In pouring operations the mold is held together with cord or tape. Very viscous casting mixtures should be carefully worked into the crevices and detailed parts of the mold with a stirring rod or spatula before the main pour is made.

FIG. 5—Mold slit on two sides.

Influence of Polar Compounds

(Continued from page 346)

of ethylene glycol to hydrated calcium silicate GR-S stocks does not improve the flex life of the vulcanizates, it does not have any detrimental effects on this property. This is illustrated in Table VIII. The flex life was determined with a DeMattia flexing machine in accordance with the A.S.T.M. method D813-44T. The test pieces of Stocks A and B were cured for 60 minutes at 280° F., while those of Stock H were cured for 20 minutes at 280° F. This permitted comparison among specimens of comparable states of cure. The figures reported are the number of flexes required to produce 80% of failure.

The softeners used in these stocks are of the conventional type widely used in GR-S compounding. However, there are other types which are even more satisfactory for compounding with non-carbon black GR-S stocks. Among these are the coumarone-indene resins. These resins are especially useful for compounding with hydrated calcium silicate GR-S stocks. The addition of ethylene glycol is just as effective in reducing the heat build-up of this type of compound as it is in reducing the heat build-up of the stocks already mentioned. This is indicated in Table IX.

Summary

In summing up it is evident that polyhydroxy and amino compounds are valuable materials which can be used to overcome the major deficiency of hydrated calcium silicate GR-S vulcanizates, and which at the same time will enhance some of the other properties of these compositions. They may therefore serve to broaden the fields of usefulness of hydrated calcium silicate and make it available for applications for which it has previously not been suitable.

Production of German Medical Goods

(Continued from page 342)

The other items made with Buna were drainage and irrigation tubing, and the formula for these is as follows:

DRAINAGE AND IRRIGATION TUBING

Buna S (Defo 500)	15.00
Buna SS (Defo 500)	15.00
White Factice (S_2Cl_2 type)	26.00
Sulfur	0.80
Zinc Oxide	4.00
MBT	0.40
Vulcacit AZ	0.40
Red Dye	0.12
Orange Dye	1.08
Lithopone	7.20
Clay	30.00
	100.00

The same practice was used in manufacturing this tubing as for natural rubber tubing. However, it was found impossible to make "roll-end" tubing with this Buna stock and therefore instead of putting the roll on the end as was done with natural rubber tubing, a short tubed collar was placed over each end and cemented in place to replace the roll end on these 1.25 m. lengths.

It was stated that with a little time to experiment a satisfactory roll end tubing with the Buna stock could have been made.

Samples of various of these sundry items were taken from the plant and arrangements made to ship them back to the United States.

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Editorials . . . . . .

Holiday Greetings

NEVER have the words "Peace on Earth, Good Will Toward Men" meant more than they do as the year 1945 draws to a close. Final and complete victory is ours and, far more important, it lies within the grasp of mankind to establish and maintain peace for centuries to come. The past years have been difficult, the present is interesting, the future is promising. The staff of RUBBER AGE again uses this medium to extend best wishes to their friends for Christmas and the New Year.

THE PUBLISHERS

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Butadiene Situation

THE abandonment of the alcohol-butadiene portion of the government's over-all synthetic rubber program by the Office of Rubber Reserve, reported elsewhere in this issue, was far from unexpected and, in fact, had been anticipated for some time. The companies operating these facilities for the government recognized the economics of the situation from the very beginning and realized that it was only a question of time before the high cost alcohol-butadiene plants were discarded in favor of the lower-cost petroleum-butadiene plants. Were it not for the fact that the demands for high octane gasoline were so tremendous throughout the war period, it is problematical as to whether some of the alcohol-butadiene facilities would have been constructed. One fact should not be lost sight of, namely, that at one time the alcohol-butadiene plants were furnishing the greater portion of butadiene to the copolymer plants.

Abandonment of three petroleum-butadiene units, however, is another story. It is true that the three units being shut down were all conversions of oil refineries and were among the highest cost units of their kind. Such costs were still considerably below those of the alcohol-butadiene units and not too high above those of other petroleum-butadiene units. Closing down these facilities might indicate a temporary surplus of synthetic rubber. It is known that an inventory of some 150,000 tons of GR-S is in the hands of Rubber Reserve and the industry and that production has been exceeding consumption in recent months. Rubber Reserve maintains, however, that this inventory was deliberately built in anticipation of greatly increased demand once consumption restrictions were removed.

Simple arithmetic is the answer to synthetic rubber production for the next twelve to fourteen months. It is estimated that consumption of rubber—natural and synthetic—in the United States will run about 900,000 tons in 1946. Rubber Reserve is scheduling approximately 900,000 tons of GR-S for the year, of which some 300,000 is earmarked for export. The rubber-producing areas in the Far East are expected to turn out 600,000 tons in the same year, approximately half of which will reach this country. Therefore, we should have available in 1946 600,000 tons of GR-S plus 300,000 tons of natural rubber, or sufficient for our needs.

Actual production of GR-S during 1946 will depend upon conditions in the Far East. Should the political disturbances in the Netherlands East Indies continue to interfere with the cultivation and shipment of natural rubber from that area for too long a period and should the British fail to produce their estimated quota in Malaya due to continued labor difficulties, then the production of GR-S will undoubtedly be stepped up to meet any lag which might develop. Should this be the case, the chances are strong that one or more of the three shut-down petroleum-butadiene plants will be reopened, and at least one of the alcohol-butadiene units restored to operation.

Public Hearings

PUBLIC hearings have been scheduled in Washington on January 8, 9 and 10, by the Inter-Agency Policy Committee on Rubber. The hearings are designed to "make sure that all interested groups have ample opportunity to be heard." The two primary objectives of the hearings are to obtain and assemble pertinent statistical, technical and economic information on both short and long-term rubber requirements and supply and to secure information leading to acceptable programs on maintenance of the synthetic rubber industry, maintenance of standby facilities, encouragement of rubber research and development, establishment of a strategic stockpile of rubber, etc. These are problems of vital interest to the rubber manufacturing industry. If any rubber manufacturer can offer a solution to any of these problems, the hearings present an excellent opportunity.

CURRENT NEWS OF THE MONTH

DISCARD ALCOHOL-BUTADIENE FACILITIES IN REVAMPING OF SYNTHETIC PRODUCTION

PLANS FOR HALTING all production of alcohol for conversion into butadiene in the over-all synthetic program and closing down of three plants making butadiene from petroleum were announced by the Reconstruction Finance Corporation in Washington on December 4. The alcohol-butadiene plants affected by the decision are those operated by the Carbide & Carbon Chemical Corp. at Institute, West Va., and Louisville, Ky., and that by the Koppers Corp. at Kobuta, Pa. The petroleum-butadiene plants to be taken out of production are those operated by the Humble Oil & Refining Co. at Ingleside, Texas, the Lion Oil Refining Co. at Eldorado, Ark., and the Taylor Refining Corp. at Corpus Christi, Texas. The styrene operations of the Koppers organization at Kobuta are also being brought to an end, as are those at Institute.

According to J. D. Hadlock, associate director of the Office of Rubber Reserve (RFC), the major reason for abandoning alcohol in favor of petroleum as a butadiene source is "purely dollars and cents." He pointed out that the cost of butadiene during the current year was approximately 40c a pound from alcohol compared with 8c to 10c a pound from petroleum, which made the cost of GR-S from alcohol-butadiene approximately 24½c a pound compared with 12c to 13c a pound when based on petroleum-butadiene. The decision to close the plants was attributed to a directive from the Office of Mobilization and Reconversion which instructs Rubber Reserve to run synthetic rubber production "on an efficient and economical basis in the best interests of the government."

Plants in Stand-by Condition

The point was emphasized that the three alcohol-butadiene plants, all of which are owned by the government and operated under lease, will be kept in a stand-by condition. The cost of these three plants to the government was approximately $117,000,000. More specifically, the Institute plant had a capacity of 80,000 tons a year and cost $49,000,000; the Louisville plant cost $25,500,000 and had a capacity of 60,000 tons a year; and the Kobuta plant cost $42,500,000 with a capacity of 80,000 tons a year. At this writing (December 14), the plant at Louisville has already been closed and those at Institute and Kobuta are in the process of being closed. The styrene plants at Institute and Kobuta, which cost approximately $29,400,000, are also in the process of being closed.

The three oil refineries, all of which were converted to make butadiene from petroleum at the height of the rubber crisis, at a cost of approximately $8,300,000, are being closed because of high cost of operation. These three plants contributed only a small part of the total butadiene output, averaging about 13,000 tons annually. The government will restore them to condition for oil refining.

In some quarters it was stated that closing down of these petroleum-butadiene facilities was indicative of a temporary glut of synthetic rubber in the United States. It is known that the inventory of GR-S held both by the rubber industry and by Rubber Reserve amounts to some 150,000 tons but Rubber Reserve maintains that this inventory was purposely accumulated and reached its present figure because strikes, shut-downs, etc., played havoc with estimates of consumption in the past few months.

According to Rubber Reserve, the remaining petroleum-butadiene plants can produce sufficient butadiene to make 900,000 tons of GR-S annually. Since it is now estimated that the United States will secure approximately 300,000 tons of natural rubber during 1946, the estimated need for GR-S has been set at 550,000 tons. It is also estimated that 300,000 tons of GR-S will be exported. Based on these figures, the remaining petroleum-butadiene facilities will be adequate.

Further explaining the cost angle behind the decision to close both the alcohol-butadiene plants and the three petroleum-butadiene plants, Mr. Hadlock stated that some petroleum-butadiene plants were actually producing butadiene at 8c a pound while by contrast cumulative production costs through July, 1945, for each of the three petroleum-butadiene plants being closed were: Lion, 25c a pound; Taylor, 37c; Humble Oil, 28.2c. For the first eight months of the current year, the average production cost at the three alcohol-butadiene plants was 40.5c a pound, this figure being based on alcohol which cost 90c a gallon and which recently dropped to 80c a gallon.

It was pointed out, however, that a ceiling on industrial alcohol of between 50c and 51c a gallon may shortly be set by OPA and if the alcohol-butadiene plants should be reopened in the next few months using 50c alcohol, they could produce butadiene at 24c a pound from which GR-S could be made at 24½c a pound.

Due cognizance was taken by Rubber Reserve of the fact that farm blocs in Congress have constantly urged the continued use of alcohol for butadiene on the basis that such use provides a large outlet for grain. In this connection Rubber Reserve pointed out that short of government subsidies there appears no way to make the alcohol plants economically feasible and Rubber Reserve, which supervises synthetic rubber production, has no authority on subsidies.

Prior to the decision to close the alcohol-butadiene facilities at the Kobuta plant operated by Koppers, it was understood that Koppers was negotiating with Rubber Reserve on a proposal to use benzene as a base in the production of butadiene at the Kobuta plant. Some industrial sources are of the opinion that butadiene can be produced from benzene as cheaply as from petroleum and definitely cheaper than butadiene from alcohol.

Report of Study Group

As briefly reported in our previous issue, a meeting of the International Study Group on Rubber took place in London on November 24. This Group comprises American, British, Dutch and French experts, the latter having been invited just prior to the session held in London.

George Archer,, Under Secretary, Raw Materials Department, British Ministry

Schedule Open Hearings

The Inter-Agency Policy Committee on Rubber, organized by the Office of War Mobilization and Reconversion a few months ago to determine a national policy on rubber for the United States, has announced its intention to hold public hearings on rubber requirements and supply, production costs of natural and synthetic rubber, and related subjects, in Washington on January 8, 9 and 10. The committee is headed by William L. Batt. Persons wishing to be heard or to file briefs with the Committee should communicate with Howard S. Piquet, executive secretary, Room 4737, Social Security Building, Washington, D. C.

of Supply, presided over the meeting. Donald D. Kennedy, Chief, International Resources Division, Department of State, the leader of the American Group, acted as vice-chairman. The French delegation was led by M. Peter, Director for Economic Affairs, Colonial Ministry, and the Netherlands' delegation by Mr. P. H. Westermann, Trade Commissioner for the Netherlands Indies in London.

Further studies of the prospective world rubber situation were presented to the Group on behalf of the participating governments. These included the latest information on the United States' synthetic industry, and such reports as have become available on conditions in the Far East since the liberation of the rubber producing areas.

United States capacity for the production of general and special purpose synthetic rubber is now about 1,055,000 tons per annum and total world capacity may be estimated at 1,300,000 to 1,400,000 tons. Preliminary reports from Indo-China indicate that there has been no damage to trees on rubber estates, and that in Malaya not more than 10 percent of the trees have been destroyed during the Japanese occupation. No reliable information is as yet available from the Netherlands Indies. Discussions took place on the measures being taken to rehabilitate the natural rubber producing areas.

In view of the disturbed political conditions, the severe shortage of labor, equipment, food and other consumer goods, and the disrupted transportation system which will require extensive repair and re-equipment, any figure of the future rate of production must remain conjectural for some time to come. Stocks in various parts of the Far East at the time of liberation were estimated to be from 200,000 to 300,000 tons, but it is not known how much of these will actually be assembled and shipped. The Group, while emphasizing the tentative nature of any conclusions, suggested that supplies of natural rubber becoming available in manufacturing countries from all areas of the world, including the Far East, during 1946 might reach approximately 600,000 tons.

Long-Term Estimates Unchanged

Looking to a longer period, the Group saw no reason to modify the conclusion reached at its first meeting, namely, that "actual production, if required, of the natural rubber areas of the world could rise in three to four years to an annual figure in the neighborhood of 1,500,000 tons of rubber." This gives a total world potential capacity of natural and synthetic of about 2.7 to 2.8 million tons, though actual production will probably not approach such figures.

The estimate made at the first meeting of the amount of rubber likely to be processed and consumed in the next few years put the figure at a maximum of 1,500,000 tons annually of all types of natural and synthetic rubber. The Group, after full consideration, felt that this remained a reasonable estimate. As previously stated, this estimate depends on the maintenance of a high level of economic activity in consuming countries but assumes that there will be no sudden large development of the uses of rubber. The long term trend of consumption is expected to continue upwards.

Discussions at the Group meetings suggest that there will be a range of uses for which natural rubber may be better suited than synthetic, and another range in which synthetic may be preferable to natural. Between these, however, there may well be a large area in which satisfactory results may be expected from either form of rubber and where manufacturers are likely to be guided in their preference by the relative costs of the raw materials, of processing and of the performance of the end products.

As regards costs, information discussed at the meetings showed that plant manufacturing costs in the United States have declined markedly in the recent past and are more than covered by the present selling price of 18½ cents per pound for general purpose synthetic. Indications were given that the trend of production costs is still downward.

It was considered that the uncertainties of the situation in the Far East made it impossible to reach any conclusions about probable costs of production of natural rubber in normal conditions. The terms of reference of the Group provide that other interested governments shall be kept informed of its work and steps will be taken to this end.

It is hoped to arrange a further meeting of the Group as soon as more adequate information is available of developments in the rubber-producing areas.

Viles Issues Statement

On his return to the United States from the London conference where he served as a member of the American delegation, A. L. Viles, president of the Rubber Manufacturers Association, stated that the Study Group had estimated that the uncertainties of the situation in the Far East made it probable that supplies of natural rubber in 1946 would be less than had been generally expected and that continued high production of synthetic rubber would be necessary in order to meet the enormous pent-up demand for tires and other products. He indicated that it is likely that total passenger car tire production in the United States in 1946 will be considerably more than double 1945 production and forecast that a total of 600,000 tons of synthetic rubber would be consumed in this country alone.

Although conceding that the Study Group had estimated that in two or three years there might be a large surplus rubber capacity, Mr. Viles expressed optimism that the cost trend for both synthetic and natural rubber would be progressively downward to the point where world rubber demand would accelerate quickly and, further, that large new uses can be confidently expected. He added that the American rubber manufacturing industry felt keenly that it was necessary to maintain a strong synthetic rubber industry to insure national security.

Mr. Viles hailed the Study Group meetings in London as worthy of consideration for other international commodities and stated that the frank expression of views between representatives of the governments substantially interested in both production and consumption had done much to prepare a sound factual basis for the development of future policy by each of the factors represented. In this connection, he praised particularly the constructive leadership of Mr. Kennedy.

In concluding his statement, the RMA executive said that he felt the Study Group meetings would tend to dispel the idea of a forthcoming war between the synthetic rubber industry and natural rubber producers for consumer acceptance in world markets. He contended that once the "insurance availability" of sufficient synthetic plant and sufficient synthetic rubber production was assured, the law of supply and demand would determine the amount of each to be used, and would insure the consumer progressively better products at progressively lower cost.

MAY ALLOW MORE NATURAL RUBBER FOR PRODUCTION OF BELTING

Plans are under consideration by the Civilian Production Administration to increase the production of conveyor belting, which is termed a reconversion bottleneck, by permitting the use of more natural rubber in this important industrial product. At present, the permitted use is only 5% of natural rubber. It is indicated that some manufacturers might increase their production by 10 to 50% in approximately 30 days through the use of no more than 25% of natural rubber.

Unfilled orders for conveyor belting were estimated at 4,500,000 linear feet at the end of October, 1945, an increase of 1,000,000 feet from the order backlog at the end of June. Present estimated unfilled orders are exactly ten times the average monthly unfilled orders in 1940.

CPA's Rubber Division has requested all belt manufacturers to participate in this production program and additional natural rubber is being temporarily granted on an appeal basis. Provided that production is increased by this

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method, it is expected that the Rubber Order (R-1) will be amended shortly permitting this additional use of natural rubber on a permanent basis.

MECHANICAL GOODS

Reconversion provisions already in effect allowing industry-wide ceiling price increases for specified consumer durable goods under certain conditions have been extended to cover a limited number of mechanical rubber goods.

The extension, covered in Amendment No. 22 to M.P.R. 149 (Mechanical Rubber Goods), issued November 24 and effective December 1, applies to mechanical rubber goods whose 1944 production was one-half or less of their last representative period of peace-time production. Secondly, the reduced production must have resulted from Government restrictions or from use of the manufacturing facilities for other war goods. The third condition is that, because of a change in Government restrictions or in the needs of the war program, manufacturers generally are able to begin production again or to increase substantially the present production.

OPA said that most mechanical rubber goods have been produced in volumes equal to or greater than pre-war volumes. Such products are not covered by the extension. Those items covered represent a small number of products that have been in large part or wholly out of production since 1941, such as rubber flooring or mats, sponge rubber products and rubber-covered rolls.

Under the reconversion provisions, OPA may, by order, either at the request of an industry or by its own motion, establish new ceiling prices that will represent normal costs, adjusted for subsequent changes in prices of materials and in factory wage rates, plus the industry's average peace-time profit margin. The provisions require reasonable absorption by the distributive trades, so that retail prices for reconversion goods will be as close as possible to 1942 levels.

RUBBER HEELS

Ceiling prices already established for higher quality rubber heels sold in individual packages for the home replacement trade will apply when the same heels are sold unpackaged, according to Amendment No. 14 to M.P.R. 477 (Sales of Rubber Heels and Soles in Shoe Factory and Home Replacement Trades), issued November 23 and effective November 28. The action provides ceilings for the first time at the manufacturing, wholesale and retail levels on unpackaged standard grade heels sold in this trade and increases the existing ceilings for competitive grade heels.

In the home replacement trade, consumers buy the heels at chain stores, hardware stores, etc., and attach them to shoes in their own homes. No ceilings were formerly established for unpackaged standard grade heels as all sales have been individually packaged. Some unpackaged sales are now expected.

FORD MOTOR CO. DISPOSES OF NATURAL RUBBER HOLDINGS IN BRAZIL

In a surprise announcement on November 29, the Ford Motor Company revealed that it would shortly turn over its rubber holdings in Brazil valued at more than $15,000,000 to the Brazilian Government for the token sum of $250,000. It was reported that the resolution to end activities in Brazil was based on labor difficulties caused or aggravated by Brazilian labor legislation. The by-laws of the Ford Company call for a payment on all properties sold, which was given as the reason for requesting the payment of $250,000 from the Brazilian Government. (EDITOR'S NOTE: On December 15, Provisional President Jose Linhares of Brazil accepted the Ford offer).

The first of the extensive holdings of the Ford Motor Company in Brazil were secured in 1927. Called Fordlandia, the original development, located on the Tapajos River, a tributary of the Amazon, comprised approximately 2,500,000 acres. The first planting was accomplished in 1929-30 on some 8,000 acres. Results at Fordlandia were never quite satisfactory since leaf blight frequently destroyed entire planted areas.

In 1934 Ford secured additional acreage from the State of Para in exchange for 600,000 acres of land in Fordlandia. Planting in the latter area, which Ford called Belterra, started in 1937 with some 6,000 acres being placed under cultivation. It was estimated that over 12,000 acres were planted by 1939. The Companhia Ford Industrial do Brasil operated both plantations.

A statement issued by a Ford official at Detroit indicated that the company intends to stay completely out of the natural rubber field, the statement adding that "our war experience has taught us that synthetic rubber is superior to natural rubber for certain of our products."

Situation in Far East

Reports regarding the rubber situation in the Far East continue to be conflicting in nature although it has now been fairly well established that initial shipments will in no wise meet with early estimates. Political disturbances in the Netherlands East Indies are definitely retarding resumption of production in that country while in Malaya the chief problem is the recruiting and training of a labor force of some 50,000.

In both Malaya and the Netherlands Indies, the physical condition of the European supervisory personnel, many of whom were held in Jap prison camps throughout the war, is reported to mitigate against the early resumption of normal activities on the rubber plantations. Throughout the Far East, there is need of equipment, textiles, food and incentive goods for native rubber workers to bolster production.

According to John D. Collyer, president of the B. F. Goodrich Co., who was one of the American delegates recently attending the meeting of the International Study Group on Rubber at London, natural rubber supplies from all producing countries, including those in the Far East and those in South America and Africa, should total 600,000 tons in 1946. Of this amount he estimated 250,000 tons will consist of existing stocks found in the Far East after the Japs were driven out, plus the 150,000 tons which were found in French Indo-China.

Returning from a visit to the turmoil-ridden areas of the Netherlands East Indies, H. L. Riddle, assistant controller of the Goodyear Tire & Rubber Co., Akron, stated that insurrections by the natives will hold up natural rubber production in that area for many months to come. He reported that Goodyear's 16,000 acre plantation in Sumatra is in the hands of a Filipino and two Chinese and that approximately 500,000 trees on some 5,000 acres were cut down during the war to provide room for the raising of food. He also stated that the company's tire plant at Buitenzorg was looted several times and will have to be completely rehabilitated before it can be brought back into operation.

Two other interesting reports have come from the Far East. According to John Wilmot, British Minister of Supply and Aircraft Production, Great Britain has purchased 24,311 tons of Malayan rubber since liberation of the Peninsula and a total of 16,500 tons has already been shipped to the United Kingdom. The second report, emanating from Singapore on December 12, indicated that Malayan estates were ready to supply rubber to the United States and the rest of the world in appreciable quantities as soon as a decision can be made on setting up of foreign exchange facilities.

The first large cargo of natural rubber to reach the United States from the Far East since February 25, 1942, arrived at Staten Island, New York, on December 17. The cargo, consisting of 8,000 tons, came from the Straits Settlement.

Extend Guayule Program

Liquidation of the Guayule Rubber Emergency Program, which was scheduled for June, 1946, has been extended to December, 1946, by congressional action. The Appropriations Bill originally approved by the House of Representatives called for liquidation of the Program by June. The Senate later amended the bill to extend the liquidation to December and the extension was approved by the House on December 3.

It also has been learned that a small group of representatives, including those from California, plan to continue the fight to enable the guayule program to continue until most of the plants reach maturity. One object of this group is aimed at getting the government to turn over the guayule plantations and the processing equipment owned by the government to private interests which would carry on the work.

"ENGINEERED" COTTON FABRICS URGED IN TALK BY LOCKWOOD

The importance of "engineering" cotton fabrics to meet specific requirements was emphasized by Warren S. Lockwood, executive vice-president of the Rubber Manufacturers Association, in a talk before the annual meeting of the Cotton-Textile Institute held in New York City on November 28.

The RMA executive pointed out that with synthetic gaining more and more consumer acceptance each day, it is more and more important that cotton fabrics be engineered. In too many cases in the past, he said, the rubber industry has had to accept so-called standard constructions. If through cooperative research these fabrics had been engineered, they would have served the ultimate consumer better and often more economically, according to Mr. Lockwood, inasmuch as textiles are put to complex uses in the rubber industry and the best results are not always obtained with the standard constructions.

Citing one important requirement, Mr. Lockwood called attention to the need for a loop selvage on many of the fabrics used by the rubber manufacturing industry. This has been furnished by some mills and could be furnished by many others. Properly done, it does not represent an added cost, he said, but in reality represents an economy in the production of goods.

Outlines Potential Consumption

Discussing the potential field for cotton consumption in the rubber manufacturing industry, Mr. Lockwood disclosed the substantial consumption figures for cotton fabric that were estimated for various branches of the rubber manufacturing industry by divisions of the Rubber Manufacturers Association.

For example, twenty-seven companies of the Coated Materials Division estimated a consumption for essential civilian uses, exclusive of the military, of nearly 78 million yards of all types of cotton textiles in 1945—to be coated with natural and synthetic rubber. This figure of 78 million yards, he said, is exclusive of additional requirements of the other branches of coated material manufacturers using pyroxylin, vinyl resins, and oil.

Footwear, it was estimated, would require an annual consumption of some 32 million yards of woven goods and 6½ million pounds of knit goods for civilian uses only in 1945, while for mechanical goods estimates for the year were as follows: approximately 66 million pounds of ducks; 45 million yards of sheeting, and 38 million yards of operating supplies (wrapper and lining fabrics). If normal industrial conditions prevail and if an adequate supply of cotton fabrics is available, it is the confident hope of these industries that the 1945 estimates will all be at least equalled in 1946.

Referring to tires, Mr. Lockwood pointed out that rayon has become the chief competitor of cotton in the tire industry. In the period from July, 1944, to July, 1945, approximately 170,000,000 pounds of rayon tire cord were produced compared with 221,000,000 pounds of cotton tire cord. Present annual rated capacity for rayon tire cord is reported at 240,000,000 pounds compared with 320,000,000 pounds of cotton tire cord. This is a drastic change from the thirties when the tire cord business was almost exclusively a cotton business.

Calling attention to the serious shortage which has existed in cotton broad woven fabrics due to stringent controls, Mr. Lockwood referred to one of the reports of the Director of Rubber Programs to the War Production Board wherein it was stated that this shortage was so serious that it was threatening orderly reconversion of the rubber products field.

Emphasizing the fact that new fabrics have made tremendous progress in the last ten years, Mr. Lockwood recommended that a substantial effort and capital outlay be made for the purpose of research in the development of better cotton fabrics in order to make cotton fiber competitive with these new fibers.

With regard to the ratio of synthetic to cotton fiber in 1946 or 1947, he stated that the rubber manufacturing industry is in no position today to say which fibers are going to prove the best. His prediction was that one group of fibers would take the lead, another would be so stimulated as to draw along and then pass the first group, thus creating a "battle of the fibers."

Coming Events

Dec. 21. Boston Rubber Group, Xmas Party, Copley Plaza Hotel, Boston, Mass.

Dec. 21. Chicago Rubber Group, Xmas Party, Morrison Hotel, Chicago, Ill.

Jan. 4. Philadelphia Rubber Group, Benjamin Franklin Hotel, Philadelphia, Penna.

Jan. 7-11. S.A.E., Annual Meeting, Book-Cadillac Hotel, Detroit, Mich.

Jan. 11. Quebec Rubber & Plastics Group, Ritz-Carlton Hotel, Montreal, Canada.

Jan. 24-26. Division of High-Polymer Physics, American Physical Society, Columbia University, New York.

Jan. 25. Chicago Rubber Group, Hotel Morrison, Chicago, Ill.

Feb. 8. Quebec Rubber & Plastics Group, Ritz-Carlton Hotel, Montreal, Canada.

Feb. 25-Mar. 1. A.S.T.M., Spring Meeting, Pittsburgh, Penna.

Feb. 25-Mar. 2. 20th Exposition of Chemical Industries, Grand Central Palace, New York City.

Apr. 10-12. Rubber Division, A.C.S., Atlantic City, N. J. (Tentative).

June 24-28. A.S.T.M., 49th Annual Meeting, Buffalo, N. Y.

Sept. 8-15. American Chemical Society, Chicago, Ill.

VINYL PLASTIC PRODUCERS GEARING FOR MASS MARKETS

Producers of vinyl plastics are looking forward to supplying mass outlets directly after the turn of the year following the completion of plant reconversion, according to a survey undertaken by the New York *Journal of Commerce*. Although the vinyl plastics were introduced in the higher brackets of consumer goods before the war to gain prestige for the material, manufacturers have mass consuming markets in mind and are confident that prices can be reduced to a point where they will be competitive with other materials.

One large producer of vinyl plastics with a capacity for handling more than 350,000 pounds of material daily said recently that in less than two months the plant will be set for large scale production of rigid sheets, flexible sheeting and film, resins for surface coatings, adhesives, and molding and extrusion compounds at prices attractive to a large variety of different type manufacturers and industries. The price of the material for fabrication of novelty items and raincoats will be competitive with the price of rubber, it was indicated.

Vinyl resins have declined from a high of $1 a pound to prices ranging up from 35c a pound. The cost of the finished material for fabrication of articles is brought still lower after plasticizers are added. Compounds for forming into finished articles and coatings contain from 25 to 40 per cent plasticizers which sell for 17c or 18c a pound. As a result of this fact and the possibilities of reduced production costs, producers do not regard future prices of vinyl plastics prohibitive to mass marketing.

While the supply of vinyl resins is adequate the demand for them exceeds the ability of producers to furnish material because manpower shortages have somewhat delayed plant reconversion. It was pointed out by one manufacturer that wartime products did not require the precision necessary for peacetime markets. Thus reconversion in the plant means the precision grinding of calenders and other machines.

Consumer items of vinyl plastics already projected for mass markets include: footwear, millinery, luggage, rainwear, belts, suspenders, and other accessories, and containers of all kinds from the wardrobe to the kitchen. Growing industrial uses visualized for the vinyls are filters, chemical-resistant hose, wire insulation, and various other products notably in the electrical field but also in numerous other basic industries.

While the scuff-proof material has been widely used in women's shoes, large quantities are now expected to be channeled into the production of men's shoes. Increased use of it in both uppers and soles and trimming of women's shoes is also predicted. The material is said to be 10 times better than topgrade prewar leather for wear qualities and to exceed that of rubber compositions.

TIRE TESTING AGENCIES ISSUE REPORT ON COTTON CORD TIRES

Truck tires made with improved cotton cords gave outstanding performance in government tests conducted during the war years, according to a summary report prepared by the testing agencies and issued by the Agricultural Research Administration of the U. S. Department of Agriculture. The improved tires, made from selected varieties of cotton, stood up under rough driving markedly better than tires made from standard cotton cord. Passenger car tires made of cotton cord and also tested during this period were still in good driving condition after nearly 70,000 miles of high-speed driving.

Research for better tires was started early in the war in an effort to provide the armed forces with the most dependable tires that could be produced. The Southern Regional Research Laboratory of the Department of Agriculture, located in New Orleans, was one of the research groups working on the improvement of cotton tire cord.

To develop a cord that would be satisfactory for synthetic rubber which it was known would have to be used, laboratory scientists first investigated what is known as the low-gage cotton cord, which they believed would outwear and outrun the larger or high-gage cord that had been in use for many years. Tires made with low-gage cord require less rubber and permit the production of a cooler running tire, which is desirable.

The next step was to select certain commercially available varieties of cotton from which the scientists believed better cord could be made. Then low-gage cord fabrics from the selected varieties were made and delivered to a tire manufacturing company which put on the rubber and turned out the finished tires. The first of these experimental tires were truck size 7.50-20 and were made of 90 percent synthetic rubber and 10 percent natural rubber. They were turned over to the Army for official testing at the Army ordnance tire testing grounds at San Antonio, Tex. The testing vehicles were 2½-ton trucks carrying a 5,000-pound pay load. The test course consisted of 70 percent paved roads, 15 percent gravel roads, and 15 percent cross country terrain. The tires were rotated every 800 miles.

Tires Gave Good Results

All experimental tires gave satisfactory results, but those made with the improved cotton cord gave higher mileage and better impact resistance to rock ledges and other obstacles than those made from standard cotton cord used as control comparisons. Tires made with cotton of the Stoneville variety were roughly 20 percent better than the standard cord; those made from SXP, 75 percent better; and those made from Wilds, 132 percent better. No rayon tires, however, were used in these tests, which were made in 1943.

Later tests made in the summer and fall of 1944 included standard and improved cotton cords in 6.00-16 passenger-car tires, and standard and improved cotton cords and rayon in the 7.00-20 light-truck tires. The cords used in these tires were of the gage that is commonly used in commercial cotton-cord tire production. The improved cords were made from Wilds cotton, the variety that gave the best performance in the 1943 Army tests. The tests were made by the government tire test fleet of the Rubber Reserve Company at San Antonio, Tex.

The results of the 1944 tests showed that rayon and the improved cotton cord performed better in the light-truck tires than the standard cotton cord. Rayon cord give slightly better performance than the improved cotton cord, but this was attributed mainly to a difference in the type of cord construction used as no fabric failures occurred in any of the tires made with the improved cotton cord.

Standard and improved cotton cords were used in the passenger car tests. No rayon was used. The testing vehicles were 1942 four-door sedan-type automobiles. The cars were run at 60 miles an hour on paved highways out of San Antonio. The reports show that both the standard and improved cotton cords gave entirely satisfactory performance in these tests. With one recapping, both the standard and the improved cotton cords ran a total of 68,000 miles and the carcasses were still in good condition in both cases. With another recapping, the tires could have run farther demonstrating that the standard as well as the improved cotton cord is entirely adequate for high-speed passenger-car driving.

New Engineering Publications

Publication of the largest series of books on physics and electrical engineering ever undertaken in the United States has been arranged by the Massachusetts Institute of Technology, Cambridge, Mass., for the Office of Scientific Research and Development. The Radiation Laboratory Technical Series, comprising 28 titles and a general index, reports the results of five years' wartime work on radar. The purpose of the series is to make available to science, industry, and the public generally the results of the immense developments in electronics and in microwave theory and technique during the war years, which, once secret, have now widely been declassified. Publication of the series will be handled by an agreement between M.I.T., acting for the Office of Scientific Research and Development, and the McGraw-Hill Book Co., which is undertaking the actual publication.

CAMOUFLAGED INFLATED TARGETS SUCCESSFULLY DECEIVED ENEMY

The War Department has permitted disclosure of the fact that thousands of rubber inflated "weapons" were successfully used as decoys to deceive the enemy in the late war. For example, just before D-Day, the Germans saw fleets of invasion craft that didn't exist, loaded with weapons that never were forged, and pointed for attacks that never were planned. Pneumatic balloon fabric models were constructed to simulate PT boats, barges, tanks, tank destroyers, field and heavy artillery, combat vehicles, Bofors guns, and inflated targets. Both the Goodyear Tire & Rubber Co. and the Firestone Tire & Rubber Co. played prominent roles in the construction of these decoys. Four of these decoys are pictured above, the top two being models of a Bofors gun and an M-4 tank, respectively, made by Firestone, and the lower two an LCT and PT boat, respectively, made by Goodyear. Firestone also made actual Bofors guns at Akron.

TECHNICAL PAPERS FEATURE MEETING OF A.S.M.E. RUBBER GROUP

Several interesting technical papers featured the meeting of the Rubber and Plastics Division of the American Society of Mechanical Engineers, held at the Hotel Pennsylvania in New York City on November 27 in conjunction with the 66th Annual Meeting of the parent society. Two sessions were held, one on plastics in the morning and the other on rubber in the afternoon, under the joint sponsorship of the National and Metropolitan Rubber and Plastics Divisions.

A luncheon business session was held between the plastics and rubber sessions, at which the new chairman, James H. Booth (Thompson Products, Inc., Detroit, Mich.) and the new secretary, Henry M. Richardson (DeBell & Richardson, Springfield, Mass.), were introduced. Discussion at this informal session centered upon the interests and activities which should be pursued by the Division.

The need for reliable information on the properties and uses of plastics was stressed and it was agreed that some effort should be made to correlate available information so that the Division might publish satisfactory data. A start on a policy and program of this sort was made by Dr. J. F. Downie Smith (United Shoe Machinery Corp.) some years ago, who compiled a list of the information which engineers need relating to the properties of rubber. Dr. G. M. Kline (National Bureau of Standards) has given some thought to a similar list for plastics.

At a subsequent session held by the Executive and Advisory Committees of the Division later in the day, under the chairmanship of Mr. Booth, it was suggested that a symposium on the hysteresis properties of rubber, in which representatives of the leading rubber companies would participate, might prove both interesting and enlightening at some future meeting. Suggestions for other possible papers and features for the two meetings to be held by the Division next year were also discussed.

Four papers were delivered at the rubber session, as follows: *Foam Sponge Rubber: Manufacture and Application,* W. L. Jantzen (U. S. Rubber); *Creep of Neoprene in Shear under Static Conditions,* W. Newlin Keen (DuPont); *A Vibration Investigation,* Lloyd Muller (Buick Motors); and *Advances in Rubber During 1945,* Ernest Chilton (Firestone). The latter report is reproduced in full elsewhere in this issue. Reports on the other three papers follow:

Paper on Foam Sponge Rubber

Discussing "Foam Sponge Rubber," Mr. Jantzen began his talk with a reference to the experimentation and development which has produced latex foam, which has a multitude of uses ranging from seating and sleeping cushions to fracture padding for medical use. The important difference between latex foam and other types of spongy rubber, he said, is that the latex foam is completely porous, hence in seating and sleeping applications it is able to completely dissipate body heat.

Application of the material to seating purposes has revealed that its supporting qualities make unnecessary the use of solid material, cores of appropriate size being run through the latex foam. The speaker also noted that while the texture does not permit use in the uncovered state, tests have shown that fabrics wear better over such cushions than on conventional cushions, and that furthermore the material may be combined with springs.

In reference to uses of the material for other than seating purposes, Mr. Jantzen said that in sheet form and of soft density it is being used as fracture padding by doctors and hospitals, that it is being used in operating table and examination table pads, is molded into invalid ring cushions and bed pillows, and that it served as lining in metal helmets during the war, provided cushioning for sights in certain telescopic instruments and linings for cases housing delicate instruments.

Summing up the qualities of the material, he stated that it is lighter in weight compared with rubber sponge; it is completely porous, hence cool; it is repulsive to vermin; it comes in stock sizes in different thicknesses and degrees of density; and it can be molded in practically any shape and resiliency as an engineered item to fit into production line procedure.

Keen on Neoprene in Shear

On the subject of "Creep of Neoprene in Shear under Static Conditions," Mr. Keen showed how the creep in shear of neoprene vulcanizates in the hardness range of 40 to 60 Durometer (Shore Type A) is influenced by degree of vulcanization, preconditioning in shear at elevated temperatures, and changes in composition. Certain long-time static creep tests, he said, show that as the degree or state of vulcanization of neoprene compositions is increased, the rate of creep and the set of these vulcanizates are decreased without appreciably altering other important mechanical properties.

Preconditioning at elevated temperatures, he stated, reduces both the rate and the magnitude of creep to a greater extent for neoprene than for natural rubber vulcanizates. However, the greatest improvement in creep characteristics has resulted from changes in the composition of the vulcanizates.

Both the composition and the degree of vulcanization must be studied in order to obtain the most desirable combination of properties for a given application, the speaker declared. Such a study should be broad enough to cover independent evaluation of the important mechanical properties involved. In the course of his talk, Mr. Keen dealt at length with the subjects of methods of testing samples, preconditioning to reduce creep, effect of changing composition, and change in properties with age and temperature.

Muller Discusses Vibration

Describing "A Vibration Investigation," Mr. Muller stated that the fact that only a slight relationship could be established between the static strength of an automobile and the "feel" of the car on the road led to the investigation, which was undertaken to explore the vibrational and dynamic strength characteristics of experimental cars and to establish the relationship of actual strength to apparent car strength.

When it was found that the feel of a car is in almost the reverse order as compared to its strength, the problem was divided into two major classifications, namely "static strength" and "vibrational or dynamic strength." In order to determine which members were the primary strength-contributing factors, and in what proportion they affected the over-all strength of the car, three static tests, namely, torsion, beam, and side deflection, were undertaken. Subsequent vibration tests, conducted on elementary spring-and-weight systems, revealed the various types of vibration to be encountered in the car.

Method of Investigation

Accordingly, the investigators dismantled a car and obtained the weight of all units and necessary spring rates. In the application of the two-spring and two-weight system to the rear axle of the car, the tires and chassis springs were considered as the two springs and the axle assembly and the body-frame assembly as the two weights. Road bumps were considered as the exciting force.

The effect of motor mountings were also explored and damping principles were applied. Finally, devices for reducing the noise level in motorcars were contrived. With the noise equipment and strength-test data assembled, a satisfactory type of body-bolt insulation was developed and used in production. Other results of the investigation, the speaker said, included a substantial weight reduction in some of the frames used and the development of satisfactory motor mounts which completely eliminate torque reaction.

Papers at Plastics Session

At the plastics session, which preceded the rubber session, three papers devoted to the following subjects were read: "Physical Properties of Resin Impregnated in Plaster of Paris," by John Delmonte, Plastics Industries Technical Institute, Los Angeles, Calif.; "The Effect of Molding Pressure and Resin on Results of Short-Time Static Tests and Fatigue Tests of Compreg," by W. N. Findley, W. J. Worley, and C. D. Kacalieff, all of the University of Illinois; and "Advances in Plastics during 1945," by R. J. Moore, Bakelite Corp., New York City.

GOODRICH CHEMICAL ACQUIRES HYCAR CHEMICAL CO. ASSETS

The B. F. Goodrich Chemical Co., Rose Building, Cleveland 15, Ohio, a division of the B. F. Goodrich Co., has acquired the physical assets, trade names and good will of the Hycar Chemical Co., and all Hycar operations in the future will be handled by the Hycar Department, B. F. Goodrich Chemical Co., Cleveland, Ohio.

The Hycar Chemical Co., formerly known as the Hydrocarbon Chemical & Rubber Co., was jointly organized by Goodrich and the Phillips Petroleum Co. in 1941. The Hycar plant is located in southeast Akron and manufacturing operations will continue at that plant. The plant employs some 200 people and has a monthly capacity of approximately 1,000 tons.

Most of the administrative and merchandising personnel of the Hycar Chemical Co. will continue with the new Hycar Department of the B. F. Goodrich Chemical Co. These include W. D. Parrish, R. E. Bitter, F. E. Bell, D. E. Sauser, D. C. Maddy, and R. C. Bascom. R. W. Thomas, F. M. Andrews, J. A. Tallant, and S. D. Morgan will no longer be connected with Hycar activities. Mr. Andrews will continue his work with Phillips Petroleum as sales manager of the Philblack Division with headquarters in Akron.

SURVEY ON PLASTIC SOLING INDICATES CONSUMER APPROVAL

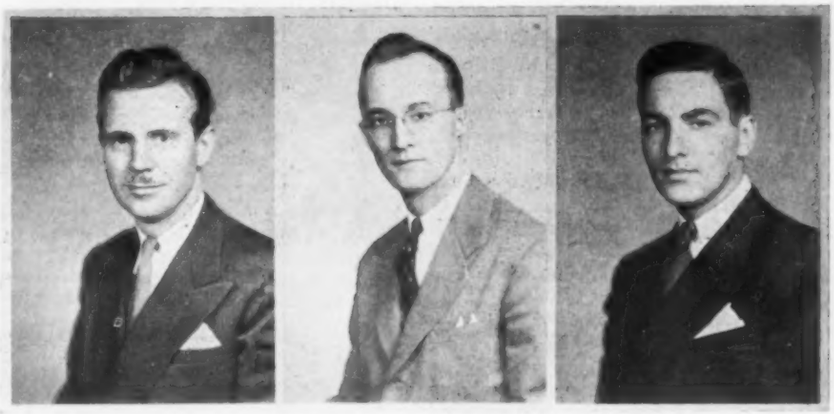
In a recent survey conducted by the Plastic Products Corporation, Boston, Mass., to measure customer reaction to plastic shoe soling, many interesting statistics were uncovered.

The survey revealed that 2,941,338 pairs of shoes, which had vinylite plastic soles, were sold. Of these, less than one-hundredth of one percent were returned for all reasons, and six of these had been worn four to six months. Many of the largest companies (one had sold 739,224 pairs, another, 900,000 pairs) had no returns at all.

The reaction of the shoe companies to vinylite plastics for shoe soles was uniformly good. Comments received by these companies included such remarks as, "customers are specifically asking for the new shoes", "customers readily accept new soling material", "buyers consider the new soles superior". Where it was possible to obtain consumer comments, they too were highly gratifying, "very pleased with performance of these new soles", "wore longer than any my children ever had before," and also "very good."

The shoe corporations were asked for their opinion of the possibilities for the new material in the future, and every answer was very definitely in the affirmative.

ADDITIONS AND CHANGES MADE BY THE BINNEY & SMITH COMPANY



L. W. Reeves R. A. Emmett A. W. Bryant

Two additions to its organization and one change in its sales staff were recently announced by the Binney & Smith Co. L. W. Reeves, formerly assistant director of purchases of the Dayton Rubber Manufacturing Co., has joined the sales staff, working out of the Akron office, and R. A. Emmett, formerly with the B. F. Goodrich Co., is now a member of the technical service division, also working out of Akron. Allan W. Bryant, who has been with the company since August, 1937, and who has been attached to the Akron sales department for the past four years, has been named resident manager of the company's new Boston office, located in the Park Square Building, Boston 16, Mass. The latter appointment is effective January 1st.

Mr. Reeves was born on August 28, 1909, in Alliance, Ohio. After attending Cornell University and the Case School of Applied Science, he joined the Commercial Investment Trust of New York as heavy industrial representative. Later he joined the purchasing department of the Hooker Electro Chemical Co., from where he went to Dayton Rubber.

Mr. Emmett was born in Detroit, Mich., on April 7, 1917, and attended the University of Michigan, graduating with a B.S. in Chemical Engineering in 1940. His work with Goodrich consisted largely of research and development compounding of synthetic rubbers.

Mr. Bryant, the new resident manager at Boston, was born on August 8, 1916, in Weymouth, Mass., and was graduated from Dartmouth College in 1937. He joined Binney & Smith in August, 1937, and worked in the technical service department in New York for four and one-half years before being transferred to the sales department at Akron.

Built Oak Ridge System

Hewitt Rubber Corp., Buffalo, N. Y., has revealed that during the war its staff built a complete coal-handling system for the atomic bomb plant at Oak Ridge, Tenn., which is said to have been one of the larger conveyor jobs of the past few years. Conveying belts, with a total length of 2508 feet and varying from 36 to 48 inches in width, were built by Hewitt, while other parts of the system were designed and manufactured by the company's subsidiary, Robins Conveyors, Inc. The equipment, which was designed for speed, is capable of handling 350 tons of coal per hour, certain belts running from 250 to 350 feet per minute. A feature of the system is an arrangement whereby coal is pulverized in a breaker en route to the boiler room of the plant. The equipment, which is valued at more than $350,000, was begun in July, 1943, and completed in August, 1944, and during this time the company maintained a secret New York office staffed with eight engineers for the highly confidential war job.

Introduce Thiokol VA-3

Thiokol VA-3, a liquid polymer containing organically combined sulfur, which holds good promise as a vulcanizing agent, was recently introduced by the Thiokol Corp., Trenton, N. J. The combined sulfur does not bloom from uncured or cured stocks and the blooming characteristics are said not to be affected by processing temperatures. A technical bulletin on the use of VA-3 in non-blooming GR-S camelback and cushion stocks is available from the company.

Adhesive Products Expanding

Adhesive Products Corporation, 1660 Boone Ave., New York 60. N. Y., manufacturers of latex and rubber cements for the shoe and other industries, has begun construction on a new addition to its plant. This makes the second addition to be built within the past three years. The new addition will be a two-story steel and concrete structure and it will be used to house additional rubber mills and a Banbury mixer.

WYROUGH AND COLLIER HEAD THE NEW YORK RUBBER GROUP

George J. Wyrough, of the Whitehead Bros. Rubber Co., Trenton, N. J., and Simon Collier, of the Johns-Manville Corp., New York City, were elected chairman and vice-chairman, respectively, of the New York Rubber Group for the 1946 season at the Annual Meeting and Christmas Party of the group, held at the Hotel McAlpin in New York City on December 14. Peter P. Pinto (RUBBER AGE) was elected secretary-treasurer and L. Cranston (U. S. Rubber) as sergeant-at-arms.

Members elected to the Executive Committee for three-year terms were William J. Woodward (American Zinc Sales), J. W. Harrison (Thermoid), and George R. Lawson (Barrett). The Nominating Committee was headed by T. A. Bullifant (Barrett), and included Otto Lang (Armstrong Tire) and Sam Martin, Jr. (Thiokol).

The meeting, which attracted an attendance of over 500 members, was devoid of a technical session and was devoted completely to fun and frolic. It featured a program of entertainment and the distribution of some 150 prizes to holders of lucky number tickets, the prizes ranging from cigarette lighters to radios. During the course of the meeting the retiring chairman, Harry Outcault (St. Joseph Lead), announced that the paid membership of the group had reached the record total of 788. Distribution of prizes was made possible by donations received from the following concerns:

Advance Solvents & Chemical Corp., Akron Standard Mold Co., L. Albert & Son, American Cyanamid & Chemical Corp., American Resinous Chemicals Corp., American Zinc Sales Co., Anaconda Sales Co. (Pigment Division), Barrett Division, Binney & Smith Co., Black Rock Mfg. Co., Godfrey L. Cabot, Inc., Caldwell Co., Callaway Mills, Carter Bell Mfg. Co., Cleveland Liner & Mfg. Co., Container Co., Cooke Color & Chemical Co., Curran & Barry, DuPont, Farrel-Birmingham Co., Flintkote Co., General Atlas Carbon Co., General Latex & Chemical Co.

Also B. F. Goodrich Chemical Co., R. W. Greeff & Co., C. P. Hall Co., J. M. Huber, Inc., *India Rubber World*, Loewenthal Co., Midwest Rubber Reclaiming Co., Monsanto Chemical Co., H. Muehlstein & Co., National Rubber Machinery Co., National Sherardizing & Machine Co., New Jersey Zinc Co., Pequanoc Rubber Co., Philadelphia Rubber Works Co., Phillips Petroleum Co., Precision Scientific Co., Rare Metal Products Co., Revertex Corp. of America, H. M. Royal, Inc., RUBBER AGE, St. Joseph Lead Co., A. Schrader's Son, A. Schulman, Inc.

Also Scott Testers, Inc., Sharples Chemicals, Inc., Shell Oil Co., Speed Products Co., Stamford Rubber Supply Co., Stanco Distributors, Inc., Standard Chemical Co., Sun Oil Co., Tanney-Costello Co., Textile Proofers, Inc., Thiokol Corp., Thompson, Weinman & Co., Wm. R. Thropp & Sons Co., Titanium Pigment Corp., United Carbon Co., U. S. Rubber Reclaiming Co., R. T. Vanderbilt Co., Vansul & Co., C. K. Williams & Co., Wilmington Chemical Corp., Witco Chemical Co., Xylos Rubber Co.

Use for Neoprene Fabric

Still another novel use of surplus war material has come to light. An automobile dealer in Richmond, Va., recently purchased two D-4 barrage balloons, made with neoprene fabric. The larger balloon, containing 768 square yards of neoprene fabric, will be cut up and used in repairs to auto roofs. Some of it may be adapted to use as an awning over an outdoor display platform. The smaller balloon may be used for advertising purposes, if gas can be found for it.

Akron Group Hears Smithers

Approximately 400 members and guests attending the meeting of the Akron Rubber Group, held at the Mayflower Hotel in Akron on November 16, heard V. L. Smithers, head of the V. L. Smithers Laboratories, deliver his talk on "The Application of High Frequency Current to the Heating and Vulcanization of Rubber." The talk was similar to that delivered by Mr. Smithers before other local rubber groups in recent months, an abstract of which has previously appeared in this journal. T. P. Kinn, of the Westinghouse Electric Co., also delivered his companion talk, in which he explained the theory and application of dielectric heating.

Boston Meets December 21

The Annual Winter Meeting and Christmas Party of the Boston Rubber Group will be held on Friday, December 21, at the Copley Plaza Hotel in Boston, Mass. W. E. Kavenagh, development manager of the Windsor Manufacturing Co., Windsor, Vermont, a Goodyear subsidiary, will deliver an address on "Germany via Jeep." The business meeting will include election of officers for the coming year. As usual, gala entertainment and the distribution of lucky number prizes will be features of the party.

Philadelphia to Hear Garvey

B. S. Garvey, Jr., technical service manager, rubber chemicals, B. F. Goodrich Chemical Co., Cleveland 15, Ohio, will be the principal speaker at the meeting of the Philadelphia Rubber Group to be held on Friday, January 4, at the Benjamin Franklin Hotel in Philadelphia, Penna. Mr. Garvey, who recently spent several weeks in Germany visiting the rubber plants and other points of interest, will discuss "Investigating the German Synthetic Rubber Industry."

ONTARIO RUBBER SECTION HEARS TALK BY J. WILSON

The second meeting of the Ontario Rubber Section of the Chemical Institute of Canada was held in Toronto, Canada, on November 22, when J. Wilson, research director of the British Rubber Producer's Research Association, gave a talk on the differences between natural and synthetic rubber and their fundamental causes.

Mr. Wilson began his talk with a sketch of the organization of the B.R.P.R.A. and a description of the fundamental scientific research carried out by that group. By comparing the chain structure of natural with other synthetic rubbers, he illustrated that the superior physical properties, *i.e.*, higher tensile, resiliency and lower heat build-up, is due to long chain molecules, low intermolecular forces and fewer points of attachment.

In synthetic rubber manufacturing, Mr. Wilson pointed out, the polymer is built up by chance collision of the molecules, resulting in an irregular chain structure. The styrene groups are not arranged in a regular or symmetrical fashion. The intermolecular forces are high which decrease tack and elasticity. The high intermolecular forces decrease the ability of the synthetic rubbers to flow together, hence the poor tack.

The fact that rubber crystallizes when stretched gives high tensile properties. As GR-S does not crystallize on stretching, it is necessary to load GR-S with carbon black to obtain required tensile strength.

The excellent physical properties exhibited by natural rubber were attributed to its regular long chain molecules which are identical whether produced in Malaya plantations, in Africa, or by any rubber latex bearing plants. The rubber molecule produced by the Dandelion is said to be the same in structure as that obtained from Hevea rubber trees.

Dr. N. S. Grace, of Dunlop, extended a hearty note of thanks to Mr. Wilson for his interesting address.

Chicago to Hear Prize Papers

The three prize winning papers in the contest on the "Utilization of Synthetic Scrap Rubber" conducted by the Chicago Rubber Group will be given at a meeting of the group to be held on Friday evening, January 25, at the Morrison Hotel in Chicago. The three prize winners have been invited to attend the meeting, but it will not be known until after dinner has been served as to who won the first, second or third prizes. The prize contest is reported to have attracted attention all over the world and so many papers were received that it took the judges many months to go over them and pick out the three best papers. First prize is worth $500 in cash, plus a $1,000 war bond donated by the firm of A. Schulman, Inc., while the second and third prizes will bring $300 and $200, respectively.

STANDARDS BUREAU REVEALS JAR RING TEST RESULTS

Failures in canning by the pressure-cooker method in which a series of experimental jar rings were used bore no relation to the rubber content or tensile properties of the rings but were related to swelling, indentation and hardness, and to changes of these properties with processing, according to tests made by the National Bureau of Standards of the Department of Commerce, Washington, D. C.

The investigation was undertaken by the Bureau of Human Nutrition and Home Economics of the Department of Agriculture in collaboration with manufacturers and the Bureau of Standards. The original purpose was to determine whether satisfactory jar rings could be made from reclaimed rubber without the admixture of new natural rubber, which at the time was becoming increasingly scarce.

Properties of the Rings

In the course of the work a study was made of the relation between the properties of the rings as measured in the laboratory and their performance in canning experiments. A brief study was also made of the irregularities of the sealing surfaces of jars and tops in order to ascertain the amount that a jar ring might have to be compressed to insure a satisfactory seal.

While failures in the canning experiments were related to swelling, indentation and hardness of the rings used and the changes of those properties with processing, the relation was not exact because some failures probably resulted from excessive variation in jars and tops, the Bureau of Standards states.

"The function of a jar ring is to form a seal between a jar and the cap or top," the Bureau adds. "As the surfaces to be sealed do not fit perfectly, it is necessary to determine the approximate magnitude and distribution of the irregularities to know how much capacity for indentation a jar ring must have to insure a satisfactory seal. The occurrence of a failure in canning does not necessarily mean that the jar ring was unsatisfactory or defective. It may be that the irregularities in the sealing surfaces exceeded those that the ring was designed to overcome."

Specification is Formulated

As a result of the studies made a proposed performance specification for jar rings was formulated which is thought to be applicable to all jar rings regardless of whether they are made of mixtures of new and reclaimed rubber, reclaimed rubber alone, or from synthetic rubber.

A description of the tests is embodied in National Bureau of Standards Miscellaneous Publication M181—"Jar Rings for Use in Home Canning, Their Testing and a Proposed Specification." Copies may be obtained from the Superintendent of Documents, Washington 25, D. C., at 10 cents each.

Named Export Sales Director

H. Walter Grote

H. Walter Grote, who has been acting as midwestern district manager of the Wilmington Chemical Corporation since early 1944, has left that organization and has joined the Phillips Petroleum Co. as director of export sales of the Philblack Division. In his new post, Mr. Grote, who has had a long career of technical service, both in foreign and domestic fields, will be in charge of all foreign distribution outlets for Philblack. He will make his headquarters at the company's offices at 80 Broad St., New York 4, N. Y. Prior to becoming associated with Wilmington Chemical, Mr. Grote served with the United Carbon Co. from 1932 to 1943 as technical representative and supervisor of laboratories. His previous experience was with the Murray Rubber Co., the Ten Broeck Tyre Co., and the U. S. Rubber Co.

Data on Tire Fatigue

The October, 1945, issue of the *ASTM Bulletin,* official publication of the American Society for Testing Materials, 260 So. Broad St., Philadelphia, Penna., contains several excellent articles on the subject of tire fatigue and testing methods for determining such fatigue. Some of these articles were originally presented at the March, 1944, meeting of the Society's Committee D-13 on Textile Materials, and discussion on them is invited by the Society. Titles of the articles and their authors follows: *An Automotive Tire Fatigue Machine,* John N. Kenyon (Columbia University); *Standard Fatigue Tester for Use by the Rayon Manufacturers,* W. H. Bradshaw (Tubize Rayon Corp.); *Comparative Fatigue Test Data,* C. S. Venable (American Viscose Corp.); *Statistical Comparison of Rayon Tire Cord Fatigue Testing Machines,* C. B. Budd (Goodrich) and L. Larrick (Institute of Textile Technology).

WILSON COMPARES GERMAN AND AMERICAN PRODUCTION

How American drive and cooperation whipped the vaunted German efficiency of regimentation in the vital matter of synthetic rubber, both as to quality and quantity, was recently told to a group of Akron business men by R. S. Wilson, vice-president of the Goodyear Tire & Rubber Co., who recently retired as Special Director of Rubber Programs of WPB. In his talk Mr. Wilson revealed the results of comparative tests of captured German synthetic tires and of studies of German technical data seized by American investigators.

Had American rubber production been based upon the German formulae and processes, we would have suffered a 33% loss in our rates of production, Mr. Wilson said. Tires made from German rubber gave only one-half the mileage afforded by American tires, he added, and since as it was, we just "got by," our transport would have broken down had we been forced to use German methods.

Mr. Wilson traced the American victory to the roots of German versus American viewpoints. In the German tradition of "efficiency," the problem of rubber was handled by three separate, vertical components: the producer of synthetic rubber (I. G. Farben), the fabricators of tires and other rubber products (the manufacturers), and the consumers of these products (the German army). Each was a law unto itself. None cooperated or compared notes with the other. German-made rubber was the best in the world, according to that viewpoint, because I. G. Farben produced and I. G. Farben had been designated for the job from on high.

It also followed, Mr. Wilson said, that tires manufactured from this material were also perfect in the eyes of Germany for the same reason. This in the face of the fact that such tires gave less than half the mileage and service the American army was able to get out of American-made tires.

Goodyear Introduces Pliocel

The development of Pliocel, a nylon rubberized fabric tank, which is reported to have attracted the interest of the "weight-conscious" aviation industry, has been announced by the Goodyear Tire & Rubber Co., Akron. The new product, which is being used experimentally by many of the nation's largest commercial, military and private plane builders, is said to be lighter in weight, to have increased flexibility, and to be more crash resistant than either the conventional metal or rubber tanks used in peacetime aircraft. The nylon material weighs only .075 pounds per square foot while metal tanks average .5 pounds per square foot and the bladder type rubber tank weighs .42 pounds per square foot. Bullet sealing fuel tanks, used in military planes during the war, weighed approximately 2 pounds per square foot.

TIRE PRODUCTION IN ITALY DEPENDS ON SEVERAL FACTORS

The shortage of rubber tires in Italy, caused by the reduction in domestic production, appropriation of raw materials and finished goods by the Germans, and damages by war, is aggravated by poor transportation facilities, damaged roads, and the worn condition of tires already being used on vehicles, according to information reaching the U. S. Bureau of Foreign & Domestic Commerce.

Coal and rubber are needed to resume tire production. Using German synthetic or crude rubber stocks, importing synthetic rubber from the United States, reactivating the synthetic rubber plant at Ferrara, importing forest rubber from South American countries, Africa, and Ceylon, and using Russian synthetic rubber supplies are possible solutions to the raw material problem. About 11,000 tons of synthetic rubber are said to be needed to start tire production.

The tire-producing factories have completely repaired the damages suffered during the war and they are ready to resume production. These factories have a production capacity of more than 1,000,000 tires for motor vehicles in a year. Restoration of the Ferrara plant for synthetic rubber was expected to be completed by the end of September and, should production be resumed there, the only importation of rubber needed would be about 1,700 tons of crude for technical uses. It probably will be necessary to import alcohol to supplement domestic production.

It is estimated that 1,044,700 tires will be needed to meet Italy's requirements for 1946, 568,200 for passenger cars and 476,500 for trucks and trailers. Tube requirements for 1946 call for 979,700 units, 528,200 for passenger cars and 451,500 for truck and trailer tires.

Plans Organic Chemicals Plant

Hercules Powder Co., Wilmington, Del., has announced plans for the construction of a $1,500,000 organic chemicals and resin plant near Burlington, N. J. When completed, the plant will produce materials used in the rubber, varnish, lacquer, printing ink, adhesive, and coated textile fields. It will be the sixth plant to be placed in operation by the company's Synthetics Department, and will be under the direction of R. F. Schlaanstine, director of operations for the department.

Tire Quotas for December

Passenger tire quotas for December, announced by OPA on November 27, will be 2,500,000, the same as for each of the past six months. The December allocation of large size truck tires also remains unchanged at 250,000, but that of small truck tires, size 7.50 and under, will be 300,000, a reduction of 50,000 from the November figure.

Rubber Cone Features Parade

One of the features of the Thanksgiving Day parade revived this year by R. H. Macy & Company, New York's largest department store, was this giant

44-foot ice cream cone, built by the Goodyear Tire & Rubber Co., Akron. The size of the rubberized cone is emphasized by the two children in the picture. Another new feature balloon made by Goodyear for this year's event, the first since the war, was an immense pumpkin.

Prices on Experimental Latices

Three experimental GR-S latices, designated X-270, X-271 and X-276, having a total solids concentration of 50% or more, are now being produced on a limited scale at some of the government-owned synthetic rubber plants. Although these experimental high solids GR-S latices are still quite new, having only recently passed from the pilot plant to the production stage, it is expected that requests from latex consumers for permission to purchase these latices will warrant additional production in quantities sufficient to permit tank car deliveries. In anticipation of such demand, the Office of Rubber Reserve, Reconstruction Finance Corp., has announced new schedules of selling prices for experimental GR-S latices produced in government-owned plants having a total solids concentration of 50% or more. When sold by the Office of Rubber Reserve the prices will be 20¼c per pound in tank car lots, 26¾c in drum lots, and 32¾c in less than one drum lots. When sold by GR-S Latex Distributors, the price is not to exceed 26¾c per pound in drum lots nor 32¾c in less than one drum lots.

New colors—red and ivory—have been adopted by the Fisk Tire Division of U.S. Rubber and will be featured in all advertising outdoor signs and display material, replacing the conventional blue and yellow heretofore in use.

N. B. S. COMPLETES SURVEY ON THE NATURE OF ADHESION

The development of adhesives for bonding metal, wood, rubber and plastic parts on aircraft has been largely empirical. A better understanding of the physical and chemical forces involved in adhesion is needed for further rational improvement of bonding materials for use in aircraft construction.

Under the sponsorship of the National Advisory Committee for Aeronautics, a research project was undertaken at the National Bureau of Standards, Washington, D. C., to obtain information on the strengths of bonds between different chemical types of adhesives and adherents. NACA Technical Note No. 989, entitled "Survey of Adhesives and Adhesions," by R. C. Rinker and G. M. Kline, prepared as the initial step in this investigation, comprises a survey of the present knowledge on the nature of adhesion.

It includes discussion of (1) the four types of intermolecular and interatomic bonds involved in the attractive forces holding matter together, (2) the chemical and physical forces through which various types of adhesives are attached to solid surfaces, (3) the effects of various factors on the properties of adhesively bonded structure, and (4) test methods employed for determining tensile and shear bond strengths.

A comprehensive bibliography contains references to the technical literature, patents, aircraft, and adhesive manufacturers' reports, and reports of the United States and British Governments.

Firestone Worked on Atom Bomb

The Firestone Tire & Rubber Co., Akron, has been permitted by the War Department to disclose that as many as 100 of its research and production workers at the Akron factories were engaged in operations connected with the development of the atomic bomb. Hundreds of compounds were devised and tested by physicists and chemists in executing their phase of the project. The special research was conducted for more than a year under the direction of Dr. J. J. Dillon, who is in charge of the Firestone Physics Research Division. Among those who assisted in the project were R. H. Kelsey, J. W. Liska, F. S. Grover, L. V. Cooper, H. L. Ebert, C. C. Daily, W. J. Daugherty, J. O. Prohaska, T. D. Maus, H. W. Bell, and A. S. Knisely.

New General Electric Plant

Construction work on the new silicone plant at Waterford, N. Y., being built by the General Electric Co. has been started. The plant, at which various insulating resins, waterproof compounds, hydraulic oils and greases, and finishing materials, will be manufactured, is expected to be fully completed and ready for operation by late 1946. Silicone Rubber will also be produced at the new plant.

SACRAMENTO ATSC STARTS NEW CONSERVATION PROGRAM

An all-out program to increase conservation of tires on civilian as well as military vehicles, and to lengthen the life of all other rubber equipment used in operating the huge supply and maintenance depot, has been launched at McClellan Field, headquarters of the Sacramento Air Technical Service Command. Need for the program at SATSC was greater than in many localities, because thousands of civilian employees drive their own cars to the field, which is ten miles from the largest city in the area.

One phase of the new program is a Rubber Conservation Course of six hours, which is attended by personnel from the maintenance, supply, ordnance and motor pool sections of the Command. This course is held in the depot's technical school, under the instruction of two civilian instructors.

Emphasis on Responsibility

Emphasis in the course is placed on individual responsibility in conserving rubber. Visual manifestations of rubber abuse are shown, through the use of condemned articles obtained from salvage. Also, films, lectures, charts and graphs are employed to illustrate vividly the necessity for conserving rubber products, and to show the reaction of rubber, both natural and synthetic, to such conditions as temperature, under or over inflation, misalignment of wheels, speeds, loads, and types of road surfaces.

The necessity of applying preventive maintenance with rubber products is further emphasized by citing statistics of causes of airplane tire failures, illustrated on a condemned airplane casing. Stressing the fact that 97 per cent of airplane tire failures are traceable to personnel and mechanical deficiencies in supply, handling, maintenance, repair, or operation, it is the objective of the course to reduce those tire failures to a minimum, by the application of preventive maintenance. Preventive maintenance is analyzed by illustratively discussing and demonstrating the what, why, when, where and how of it in its application.

A general rubber product is traced from the time it is received from the manufacturer, through the handling, storage, shipping, inspection, installation, removal, repair, testing, and operation on the installation. Specific preventive measures applicable are discussed, using information gathered from official reports, rubber conservation reports, and personnel reports of failures from abuse. It is shown that in the major percentage of cases that abuse of rubber products is traceable to careless work habits, and lack of knowledge that certain treatment of rubber articles is abuse.

The Rubber Conservation Course begins with an introductory survey of rubber conservation, stressing its importance and the importance of rubber as a strategic material of industry as well as war. It deals comprehensively with the story of synthetic rubber—background, ingredients, manufacturing process and comparison with natural rubber.

The second day of the course is devoted to preventive maintenance of general rubber products, in which individual responsibility is emphasized. The third day covers preventive maintenance of vehicle tires, with the objective of prolonging passenger car life by making the driver aware of the general condition of his tires ,and giving him hints, suggestions and information which make for longer tire life.

As only a small percentage of the personnel at SATSC are eligible to take the course, its mission would fall far short of fulfillment if it was limited to that percentage. Thousands of civilian employes drive to the Field and park their cars there. Therefore, to awaken these individual car owners and rubber users to the necessity of preventive maintenance for rubber conservation, a part of the course is given over to a courtesy spot check by students of the Rubber Conservation Course classes.

This spot check is carried through by visual inspection of various cars on the parking lots by these students. Any tire deficiency, such as under inflation or over inflation, valve cap missing, valve not in line with red balance dot, or any other factor which might contribute to undue wear on the tire is noted on a coded form on which is a diagram of the four tires in relation to their positions on the car. This form, which contains a list of 24 possible defects, is left in the car. Thus, when the driver picks it up, he can tell at a glance exactly what tire is getting an unnecessary beating.

A recent spot check brought to light these facts: 26 per cent of the tires were under-inflated; six per cent were over-inflated; four per cent needed repairs and were unsafe; 12 per cent needed recapping, 25 per cent had valve caps missing; 14 per cent showed undue wear through misalignment; and 16 per cent were worn irregularly through miscellaneous conditions.

Set Ceilings On Scrap

Uniform ceiling prices have been established for sales of two types of rubber made from gas mask scrap and reclaimed for the government. The ceilings, incorporated in Order 89 under Supplementary Order 94, effective December 17, are 10c a pound for rubber without carbon black and 6c a pound for rubber with carbon black content. The same ceilings apply on sales by government agencies to any buyers or by resellers to industrial consumers.

Where the reclaimed rubber is sold by a government agency to a reseller, it was pointed out by OPA, it is expected that the prices will be below the established ceilings so that the reseller may realize a margin on his sales.

U. S. RUBBER CO. ELECTS FIVE NEW VICE-PRESIDENTS

The U. S. Rubber Co. has announced the election of five new vice-presidents. In the photograph above Herbert E. Smith, president of the company, is seen congratulating the new officers, who are (left to right), with Mr. Smith at the far left, John W. McGovern, general manager of the Tire division; Elmer H. White, general manager of the Footwear and Fuel Cell divisions; John P. Coe, general manager of the Naugatuck Chemical and Synthetic Rubber divisions; H. Gordon Smith, general manager of the Textile division; and Ernest G. Brown, general manager of Mechanical Goods, General Products, and "Lastex" Yarn and Rubber Thread divisions. Each new vice-president will retain his title of general manager and will continue his division managerial duties.

NEW POLYMERS AUTHORIZED BY OFFICE OF RUBBER RESERVE, RECONSTRUCTION FINANCE CORPORATION

Listed below are types and properties of new experimental GR-S polymers (including GR-S latices) which have been authorized by the Office of Rubber Reserve, Reconstruction Finance Corporation, since publication of those listed in our preceding issue. Procedures for the distribution and sale of these polymers will be found in our October, 1945, issue.

X-Number Designation	*Manufacturing Plant*	*Date of Authorization*	*Polymer Description*	*Special Characteristics*
X-271-GR-S	U. S. Rubber Naugatuck	11/ 7/45	GR-S latex with a high solids content of 50-55%.	General purpose use.
X-272-GR-S	U. S. Rubber Institute	11/ 6/45	Rosin soap GR-S made to high conversion, and stabilized with 1 part Stalite; 95-105 Mooney; acid coagulated.	This rubber has good adhesiveness and cohesiveness imparted to it by its high Mooney viscosity and the use of rosin soap.
X-273-GR-S	U. S. Rubber Institute	11/14/45	GR-S-10 shortstopped with sodium sulfide and stabilized with 1.5 parts EFED; salt-acid coagulated.	Produced for materials where a special non-discoloring antioxidant is required.
X-274-GR-S	National Synthetic Louisville	11/ 8/45	GR-S-10 shortstopped with sodium sulfide and stabilized with Stalite.	For same purpose use as GR-S-10. Produced for materials where a special non-discoloring antioxidant is required.
X-275-GR-S	General Baytown	11/27/45	Same as GR-S Black I except the GR-S portion has a Mooney viscosity of 30 ± 5 which will be obtained by using the standard recipe and adjusting the modifier.	Same purpose use as GR-S Black I.
X-276-GR-S	Goodyear Akron	11/28/45	Low rosin soap GR-S latex with a high solids content of 58%.	General purpose use.
X-277-GR-S	General Baytown	11/28/45	Same as GR-S Black I, except the GR-S portion will have a Mooney viscosity of 30 ± 5 which will be obtained by using the standard recipe and adjusting the conversion.	Same purpose use as GR-S Black I.
X-279-GR-S	General Baytown	12/ 6/45	Similar to X-228-GR-S except SRF Black will be used and GR-S will be reacted to 30 Mooney by means of reduced conversion.	Due to the lower Mooney, this polymer should be easier to process.
	Reauthorizations have been issued for the following polymers which were previously authorized, made and in consumers' tests found advantageous:			
X-165-GR-S	U. S. Rubber Institute	11/ 6/45	Regular GR-S coagulated by sulfuric acid.	This type of rubber has a much lower ash content than regular GR-S, making it very suitable for use in the electric insulation field.
X-178-GR-S	U. S. Rubber Naugatuck	11/ 7/45	Regular GR-S protected with a non-discoloring antioxidant EFED.	Produced for materials where a non-discoloring antioxidant is required.
X-141-GR-S	Firestone Akron	11/ 6/45	GR-S made by charging 75 parts isoprene, 25 parts styrene using dehydrogenated rosin soap, 60-70 viscosity.	The isoprene-styrene polymer shows improved hysteresis characteristics in carcass type stock and may have improved tack. Due to the presence of isoprene, this polymer is similar to natural rubber in chemical and aging characteristics.

FIRESTONE ISSUES REPORT ON LIBERIA PLANTATIONS

The 1945 rubber crop of the Firestone Tire & Rubber Co. plantations in Liberia will total 41,000,000 pounds, and in 1946 the total yield is expected to reach 44,000,000 pounds, according to a recent statement of John W. Thomas, chairman of the company. Throughout the war these plantations operated without interruption as the only Allied source of supply of concentrated natural latex, and last year they produced 36,000,000 pounds of rubber, which was a substantial contribution to the United Nations' then dwindling pool of natural rubber.

The company has made rapid progress with high-yielding strains of rubber trees. Research work with these strains has been carried on continuously in Liberia, and is eventually expected to result in yields of from 1,000 to 1,500 pounds an acre a year. Under a 20-year-old agreement with the government of Liberia, Firestone holds leases on 200,000 acres of land for plantation use. Eighty thousand acres have been cleared and planted with approximately 10,000,000 rubber trees, ranging in age from one to 17 years. Production from the younger, maturing trees will substantially augment the present output.

Seventy percent of the 55,758 acres of producing trees was under pressure tapping in varying degrees during the war, as part of emergency measures taken to obtain the highest possible yields from the plantation, Mr. Thomas said. He added, however, that normal tapping will be restored when the present natural rubber shortage has been met.

Operations of the Firestone plantations are carried on by 25,000 native workers, under the supervision of 150 staff men. Their success, Mr. Thomas said, is the product of nearly 20 years' experience, during which the development of the country for rubber-growing has moved hand-in-hand with its social and economic progress.

Plans West Coast Factory

The Ohio Rubber Co., Willoughby, Ohio, has announced plans for the immediate construction of a new factory located on a 20-acre site near Long Beach, California. The new plant, which will furnish approximately 10,000 square feet of manufacturing space and will cost about $1,000,000, will employ 200 workers in its initial operation. Some $2,000,000 worth of products is expected to be manufactured during the first year of operation, and the annual payroll will exceed $500,000. In announcing plans for the West Coast plant, which is expected to be in operation by next summer, Franklin G. Smith, president of Ohio Rubber, disclosed that the company holds contracts with Ford, General Motors, Studebaker, Chrysler and Willys, all of which have assembly plants in the Long Beach area.

Resumes Consulting Practice

Royce J. Noble

Dr. Royce J. Noble, well-known consultant on latex technology and author of the text book "Latex in Industry," who has been associated with the Chemical Warfare Service at Edgewood Arsenal since the entrance of the United States into the war, has been retired with the rank of Lieutenant Colonel and has resumed his consulting practice at 21 Woodland Road, Malden, Mass. Dr. Noble is again prepared to offer services covering product development, research, and patent investigation, as well as engineering, on latex, rubber and synthetic rubber. In addition to his text book on latex, Dr. Noble is the author of several technical articles on the same subject which have appeared in the literature of the industry.

Develop New Coating Method

A new method of roller coating, by means of which many plastic wood and metal products can be finished before stamping, forming or other fabricating, has been developed by the Japan Co., 5103 Lakeside Ave., Cleveland, Ohio. Combining a specially-designed coating machine with infra-red baking equipment, the new method produces roller coated sheets completely baked in three minutes or less, as compared with the 15 to 20-minute periods commonly regarded as normal for the process. The process was developed specially for the use of vinyl base materials, which produce extremely tough coatings, and is applicable to such finishes as paint, enamel, lacquer, varnish and plastic coatings. Uniformity of thickness, with tolerances as close as .001", can be held, and uniform color shades are maintained. The company offers only the finishing service, not the machinery, to customers.

NEW RUBBER FARM PRODUCTS PREDICTED IN DISCUSSION

A host of new and improved products will reach American farms within the next few months, according to a talk delivered before the Indiana Equipment Dealers Association at Indianapolis, Ind., on November 27 by E. B. Newton, director of technical service, research laboratories, B. F. Goodrich Co., Akron.

Among items specified were sponge rubber mattresses for cattle for increasing milk production, rubber track crawler type tractors, rubber-lined silos, leakproof zippers, and greatly improved rubber footwear, sponge rubber seat cushions and mattresses, fat-resisting milking machine tubing, better light-aging, waterproofed textiles for farm equipment, and better synthetic farm tires.

Natural rubber of an excellent grade from kok-saghyz as an annual American farm crop was also heralded by the speaker as a promising future possibility.

Illustrating his remarks with simplified laboratory demonstrations and samples, Mr. Newton told the implement dealers of numerous other developments that can be expected. Among them were new rubbers and rubber-like materials by the hundreds, performing unique and unexpected jobs, and made from wheat, corn, garbage, soya-beans, coal, petroleum, milk, sweet potatoes and salt; tarpaulins and textiles of Koroseal and vinyl chloride for protection of equipment which cannot be housed; and Silene, a chemical material which provides an "invisible raincoat" for anything dipped in its vapor.

Others will include oil made of sand that will lubricate at temperatures as low as —50°F.; Aralac, a new textile of great beauty made from skimmed milk; frozen milk kept for months and when thawed out as appetizing and tasty as ever; new and potent sprays and spray methods for orchards and for scab control; and new hormone sprays to ripen fruit and prevent preharvest drop.

Pamphlet on Lead Time

Just prior to its liquidation and its succession by the Civilian Production Administration, the War Production Board issued a pamphlet showing the approximate lead time for procurement of a selected list of components in a number of manufacturing industries. Covering nearly 600 items, the pamphlet, designed to assist the reconversion of industry to peace time production, shows the average normal prewar time lag between the date of receipt of an order and the date of shipment on each item, the present time lag, and the estimated date when the time lag is expected to return to normal. Data on the following rubber products are included: V-belts, conveyor belting, drug sundries, mechanical goods, rubber machinery, transmission belting, and wire and cable. Lead time on most of these items is expected to reach a normal state in May, 1946, depending on the availability of natural rubber.

NAMES IN THE NEWS

MAURICE FETTERS, formerly connected with the Master Tire & Rubber Corp., Findlay, Ohio, and more recently assistant treasurer of the Southwestern Greyhound Lines, has been elected a director and treasurer of the Master concern, succeeding G. W. LISHAWA, resigned.

W. F. WRIGHTNOUR, actively associated with the tire business since 1928 and a member of the U. S. Rubber Co. organization since 1940, has been appointed merchandise manager of U. S. Tires.

F. C. THORN, who has been chief chemist of the Garlock Packing Co., Palmyra, N. Y., for the past several years, was recently appointed research director of that company. Mr. Thorn is very active in A.S.T.M. technical work, especially with Committee D-11 on Rubber Products.

HENRY P. PRYOR, who has been serving as a captain with the army for the past several years and who formerly was associated with the laboratories of the R. T. Vanderbilt Co., is now with the Rodic Rubber Corp., Garwood, N. J., as chief chemist.

EMIL SCHNITZSPAHN, who has been with the U. S. Navy for the past 32 months, has retired with the rank of Lieutenant Commander, and has returned to his position as sales engineer with the John Waldron Corp., New Brunswick, N. J.

ERNEST R. BRIDGWATER, manager of the rubber chemicals division of E. I. du Pont de Nemours & Co., Inc., has been proposed for nomination as a councilor-at-large of the American Chemical Society.

I. S. NICHOLLS, JR., executive vice-president of the Industrial Tape Corp., New Brunswick, N. J., since 1940, has been elected president of that organization, a subsidiary of Johnson & Johnson, succeeding GEORGE F. SMITH, who continues as president of the parent concern.

GEORGE R. HILL, associated with the Lloyd Manufacturing Co., Inc., for the past few years as chief chemist, has joined the technical sales service department of the Plastics Division of the Monsanto Chemical Co., Indian Orchard, Mass.

DAVID C. SCOTT, JR., who has been serving with the U. S. Navy with the rank of Lieutenant for the past few years, is now on terminal leave and will shortly rejoin Scott Testers, Inc., Providence, R. I., of which he is assistant treasurer.

E. W. DAVIS, chief electrical engineer of the Simplex Wire & Cable Co., Cambridge, Mass., gave a talk on "Latest Developments of Cable Insulation" at a meeting of the Mansfield, Ohio, Section of the American Institute of Electrical Engineers on November 14.

JOHN B. TOWER, associated with the U. S. Rubber Co. for 40 years and until recently in charge of export activities of the company's War Products Division in Washington, D. C., has returned to the U. S. Rubber Export Co. as assistant to the vice-president, with headquarters in New York.

HAROLD G. ROMAN, who has had 15 years' experience in machinery sales engineering, has been appointed New England sales representative of the F. J. Stokes Machine Co., Philadelphia, Penna.

H. L. KINCADE, connected with the U. S. Rubber Co. since 1918, has been transferred from the Pacific Coast region to the general offices in New York to serve as manager of camelback and repair materials of the company's U. S. Tires Division.

NATHANIEL WARSHAW, well-known specialist and consulting engineer in materials handling equipment, has joined the Market Forge Co., Everett, Mass., as head of its materials handling division.

DR. FREDERICK T. WALL, associate professor of physical chemistry at the University of Illinois, who has been engaged in government-sponsored rubber research during the war, recently received the annual award of $1,000 which is given by the Chicago Section of the American Chemical Society for research in pure chemistry.

MARSHALL GILLESPIE, formerly squadron manager of the Goodyear Tire & Rubber Co., Akron, and associated with the company for 15 years, has left for England, where he will serve as superintendent of Division A of the company's tire plant at Wolverhampton.

ADRIAN W. SMITH, formerly executive assistant to one of the vice-presidents of the Curtiss-Wright Corp., has been appointed manager of the Restfoam Division of the Hewitt Rubber Corp., Buffalo, N. Y.

HUGH F. BETHELL, who for the past three and one-half years has served the General Electric Co. at Bridgeport, Conn., and who was previously connected with the Norwalk Tire & Rubber Co., Norwalk, Conn., has joined the laboratory organization of the R. T. Vanderbilt Co., at East Norwalk, Conn.

H. L. COOPER, associated with the B. F. Goodrich Co. since 1942, most recently as superintendent of the ammunition loading division of the Lone Star Ordnance Corp., has been named production manager of the company's V-belt, flat belting and miscellaneous hard rubber goods departments at Akron.

HENRY G. NOSS, formerly assistant manager of distributing branches for the U. S. Rubber Co., and associated with that company since 1912, has been appointed manager of the branches, succeeding FREDERICK W. STRONG, who has retired.

W. N. FINDLEY, assistant professor of theoretical and applied mechanics, University of Illinois, was recently awarded the Charles B. Dudley Medal by the American Society for Testing Materials for his outstanding paper on "Creep Characteristics of Plastics."

HERBERT E. SMITH, president of the U. S. Rubber Co., has been appointed chairman of the rubber division of the $3,000,000 Alfred E. Smith Memorial fund drive.

E. T. RUFFNER, associated with the Goodyear Tire & Rubber Co. since 1917, and who was superintendent of the Java plant from 1934 to 1942, has been named plant manager of the Jackson, Mich., factory, succeeding R. E. LEE, who returned to Akron as manager of the plant planning and methods division.

DR. FRANCIS C. FRARY, director of research of the Aluminum Company of America, Pittsburgh, Penna., has been elected by the Society of Chemical Industry to receive the Perkin Medal, in recognition of his outstanding accomplishments in the field of industrial research.

DR. VICTOR E. WELLMAN, affiliated with R. W. Greeff & Co., New York City, and previously associated with the B. F. Goodrich Co., Akron, for 15 years, will shortly join the development department of the Calco Chemical Division, American Cyanamid Co., Bound Brook, N. J.

LEO SPERBER, who has been connected with the sales and traffic departments of the Smith Chemical & Color Co., Inc., Brooklyn, N. Y., for eight years, has been named field representative of the company in the metropolitan New York territory.

COLIN M. STEWART, who has served the B. F. Goodrich Co., Akron, since 1934, most recently as manager of the Cleveland, Ohio, office of its automotive, aviation and government sales division, has been named general manager of Compania Goodrich Cubana, S. A., Havana, Cuba, which is associated with Goodrich in the manufacture of tires, tubes and other rubber products in Cuba.

Cabot Names New Agent

Carl W. Bloom

Godfrey L. Cabot, Inc., Boston, Mass., has announced that, effective January 1, their exclusive New York agent for all types of carbon black and pine distillates will be the Raw Materials Co., of which Carl W. Bloom is president. Offices of the New York agents are at 220 East 42nd St. The Raw Materials Co. previously had been made agents in the New England territory, with headquarters at 77 Franklin St., Boston. They now take over the New York area as well, succeeding the C. J. Osborn Co., the previous agents. H. N. Richards Co. continues as Cabot agents in the Trenton and Philadelphia area, and Commercial Chemicals, Inc., remains as agents in Buffalo and vicinity.

DuPont Offers New Lubricant

Aquarex L Paste, developed to meet the need for a non-corrosive or corrosion-inhibiting mold lubricant, has been introduced by the Rubber Chemicals Division, E. I. du Pont de Nemours & Co., Inc., Wilmington, Delaware. Aqueous solutions of the new material are said to destroy the surface tack of elastomers, while steel panels exposed to the solutions at room temperature do not rust. The solutions are also said to protect steel panels from corrosion on exposure to dilute mineral acids.

Pilot Plant at Naugatuck

The Synthetic Rubber Division of the U. S. Rubber Co. recently opened a new, modern pilot plant for development and research in the company's synthetic rubber program at Naugatuck, Conn. The development activities of the three synthetic rubber plants operated by the company will be coordinated at the new pilot plant.

Sawdust in Treads

Seeking a method of giving tires better traction and eliminating chains, two brothers of Morgantown, W. Va., Clarence and Lonnie Gapen, experimented with a number of materials and finally settled upon sawdust. With the cooperation of a tire shop in Washington, Penna., a milling process was developed by which sawdust is worked into the camelback compound. Recapped tires using this camelback are reported to have carried an automobile up a 12% snow and ice-covered grade without difficulty, and to have started and stopped the car on the hill without skidding. Tire manufacturers are said to be making tests to determine the mileage characteristics of the special camelback.

Opens New York Office

The Raw Materials Co., Boston, Mass., distributors of pigments, colors and chemicals, which is headed by Carl W. Bloom, for many years associated with Godfrey L. Cabot, Inc., has announced the opening of an office at 220 East 42nd St., New York 17, N. Y. Anticipating a prompt discharge from the Navy, Commander Edward F. Heckman has been appointed manager of the new office. A graduate of Allegheny College, with a B. Sc. in Chemistry, Mr. Heckman was associated with the B. F. Goodrich Co. for more than twenty years prior to the war, serving in the chemical, engineering and mechanical sales divisions. Entering the Navy four years ago, he was commissioned a Lieutenant Commander and assigned to the Bureau of Ships where he served in the raw materials section of the ship building division, his responsibilities covering rubber and chemicals. He was advanced to the rank of Commander in 1944. In announcing the opening of the new office and the appointment of Mr. Heckman as manager, Mr. Bloom also revealed that as of January 1 the Raw Materials Co. will act as exclusive New York agent for the carbon blacks and pine distillates of Godfrey L. Cabot, Inc. It already represents that company on these products in the New England area.

New U. S. Rubber Tire

The United States Rubber Co. has evolved a new principle in synthetic passenger tire construction which will result in a stronger and safer tire, according to Dr. S. M. Cadwell, chief tire scientist for the company. Built of rayon cord and based on a "scientific method of construction," the new tire is planned for production some time early next year. No details of the new construction were revealed.

Roberts Joins Sun Rubber

Thomas B. Roberts

Thomas B. Roberts, who has been associated with various government agencies concerned with rubber at Washington, D. C., for the past few years, has joined the Sun Rubber Co., Barberton, Ohio, as national sales representative. Before entering government service with the now-liquidated Office of the Rubber Director, Mr. Roberts was a division manager for the Pennsylvania Rubber Co. While with ORD, he first assumed the post of special industry advisor and later became chief of the tire and tube section. He was also active in launching the over-all synthetic rubber program.

Plan New Plastics Laboratory

Plans for a new plastics laboratory at its Parlin, N. J., plant have been announced by the Hercules Powder Co. The laboratory will serve as headquarters for the company's development and research work on plastics, and tests will be conducted there on the three plastics materials—ethyl cellulose, cellulose acetate, and nitrocellulose—produced at Parlin and other plants operated by the company's Cellulose Products Department. Plans call for several constant temperature rooms in which plastics qualities such as flexibility, hardness and tensile strength, can be tested under conditions specified by customers.

Form Carbon Dispersions, Inc.

Carbon Dispersions, Inc., with factory and laboratory at 27 Haynes Ave., Newark 5, N. J., has been organized for the purpose of manufacturing all types of carbon black dispersions for the rubber, printing ink, carbon paper and plastics industries. In addition, the new company plans on making emulsified black, which is now being used extensively in the coloring of concrete roads and airport runways to eliminate glare, thus reducing traffic hazards. Dr. Arthur Brauch is vice-president and general manager of the firm.

LOS ANGELES NEWS

The Christmas party staged by the Los Angeles Rubber Group, Inc., was definitely one of the big events of that group's history. Three hundred thirty, including members, their wives and guests, attended the 4,550th performance of "The Drunkard", a melodrama which has been playing in its own play-house in Los Angeles for at least fifteen years. The date was Tuesday evening, December 4. This is the annual event which the ladies attend and each year is staged in a big way, the group usually taking over the entire seating capacity of a theatre.

"The Drunkard" was originally produced by P. T. Barnum at his American Museum 102 years ago and has had a continuous vogue during the entire century. The lines as presented in the Little Theatre Mart in Los Angeles are complete without mutilation.

At the conclusion of the play the rubber men took possession of the stage and installed their new officers who will serve during the year 1946.

The new officers are as follows: *Chairman,* C. M. Reinke; *Associate Chairman,* C. R. Wolter; *Vice Chairman,* P. W. Drew; *Treasurer,* P. R. Wineman; *Secretary,* H. Carroll Walker; *Directors,* Edward L. Royal, C. H. Churchill, D. C. Maddy. The officers are also directors ex officio.

Prizes given by the Group itself were awarded to the following: Wallace Maddox, William Snyder, Mrs. Edward L. Royal, Mrs. C. H. Churchill, A. G. Smith, Curtis Wolter, Willys Blount, Arthur M. Swanson, Virgil Bodle, Herb Griley, Warren Braey, Bob Abbott, and Mrs. Gilbert Dohn.

There was a nice little touch of courtesy in the presenting of a pen and pencil set to the retiring chairman, R. E. Hutchinson, by the board of directors.

The next evening meeting of the club will be held in February, the first Tuesday, in the Mayfair Hotel, the usual place of meeting. There will be no January meeting due to the proximity of the regular date to the close of the holiday season.

The new year book of the Los Angeles Group is now being put into shape and it is hoped that it will be ready for distribution at the February meeting. The plan so far has been to put out a bigger and better book each year.

One of the largest developments in the rubber industry in Southern California in many years will be the establishment in Long Beach of the million dollar plant of the Ohio Rubber Company on Cherry Avenue near the northern boundary of the city.

This company, which will celebrate its 53rd anniversary next spring, manufactures as its main items floor mats and step mats for automobiles, plus a line of hard rubber goods.

Franklin G. Smith, president of the company, makes this statement: "One of the deciding factors in our choice of a plant site is the expanding automobile industry in Southern California." Mr. Smith disclosed that his company holds contracts with Ford, General Motors, Chrysler, Studebaker and Willys, all of which companies have assembly plants in this area.

In its initial operation the factory will employ two hundred people, 25 per cent of them women. The annual pay roll will exceed $500,000 and it is anticipated that more than $2,000,000 worth of products will be manufactured during the first year of operation.

In charge of construction is the William P. Neil Construction Company of Los Angeles. The original plant, which is slated to be in production by next summer, will have 100,000 square feet of floor space.

The recent action of the national House of Representatives approving a six month extension of the guayule project liquidation date has met with general favor in Southern California. The original proposal made in the bill to recapture unspent war appropriations was to terminate the project by June 30, 1946. The Senate amended the bill to include the six month extension, thus changing the date to the end of the year. California representatives fought for this extension, giving time for the plants to reach maturity instead of digging them up.

"Carrying on the project for that additional length of time", said Representative LeRoy Lee of California, "will give us time to determine whether or not we can produce rubber in this country and the additional time will permit the salvage of both money and rubber."

The congressmen from this area said they hoped the government would take time to get the plantations and mills into private hands, both farmers and businessmen, who might feel inclined to carry on the work.

C. J. Roese, manager of development for Goodyear, will soon have completed his thirtieth year with the company. He started with Goodyear at Akron in the experimental department in 1916, shortly after graduating from Cornell University. During the first World War he served with the Motor Transport Corps in Washington as assistant manager of the tire and rim section of the Motor Vehicle Department. In 1920 Mr. Roese moved to California as manager of technical service and in 1925 he became manager of development. From 1928 to 1938 he was back at Akron as division superintendent of Plant 2, but at his own request he was again transferred to the Los Angeles plant where he resumed his former work. Mr. Roese besides his various other activities has devoted considerable time to the activities of the Los Angeles Rubber Group of which he has served as chairman for one year.

C. H. Churchill, assistant manager of the B. E. Dougherty Company, has returned from a vacation spent in Las Vegas and various parts of Arizona. He was accompanied by his wife.

Sam P. Tanney, of the Tanney-Costello Company, Akron, spent some time in the Los Angeles area in December on a business trip.

The retiring chairman and the new officers of the Los Angeles Rubber Group. TOP ROW: R. E. Hutchinson (Firestone), the retiring chairman; E. L. Royal (H. M. Royal), director; C. H. Churchill (B. F. Dougherty), director. BOTTOM ROW: H. Carroll Walker (Kirkhill Rubber), secretary; Curt Wolter (U. S. Rubber), associate chairman; Miles Reinke (Reinke & Amende), chairman; Phil Drew (Goodyear), vice-chairman; Paul Wineman (Goodrich), treasurer. D. C. Maddy (Hycar), also elected a director, is not included in the above view. Photograph by A. R. Hromatka.

Develop New Synthetic Latex

Development of a new, highly concentrated synthetic latex which, produced at a relatively low cost, is said to surpass in many respects natural and synthetic rubber now in use, has been announced by the Firestone Tire & Rubber Co. The new latex is already being produced in quantity at the government-owned synthetic plant operated in Akron by Firestone. In its initial application it is being used to waterproof and toughen animal hair for heavy duty truck cushions. Advantages of the new compound lie in its high concentration, excellent fluidity, great film strength, stability, age resistance and lack of color and odor, eliminating formerly objectionable features. Ease of handling is demonstrated by the fact that the liquid is forced through a centrifugal pump at the pilot plant at the rate of 125 gallons a minute for indefinite periods without clogging at any time. The latex also "keeps" well in storage or transit, retaining fluidity without jelling or developing lumps. Ingredients of the new compound—petroleum base, petroleum, coke and rosin—are readily available, and thereby basic costs are held to a minimum. Conversion of conventional synthetic latex plants is easily accomplished by a few minor changes in machinery and techniques.

Goodrich Chemicals Available

Formerly sold for special purposes to the rubber industry, a number of its chemicals have now been made available for sale to the general chemical industry, it is announced by the B. F. Goodrich Chemical Company, Cleveland, Ohio. Available in commercial quantities are the following: Phenyl B Naphthyl Amine, Mixed Mono- and Diheptyl Diphenyl Amines, Isopropoxy Diphenyl Amine, p Hydroxy Diphenyl Amine, N-Nitroso Diphenyl Amine, Diphenyl p Phenylene Diamine, Di B Naphthyl p Phenylene Diamine, Monobenzyl Ether of Hydroquinone, Di Isopropyl Dixanthogen, Mixed Ethyl and Dimethyl Mercaptothiazoles, and Mixed Aliphatic Thiazyl Disulfides. Dibenzyl Ether of Hydroquinone is available in pilot plant quantities.

Newth Rubber Suffers Fire

A fire causing damage initially estimated at between $75,000 and $100,000 on November 23 swept the large, one-story building of the Newth Rubber Co. in Barrington, R. I. Most of the building was destroyed along with some 200,000 pounds of rubber, while a good deal of the machinery and equipment was believed damaged beyond repair. The fire started in the mixing room and is believed to have been caused by cork shavings.

Dayton Rubber May Split Stock

Stockholders of the Dayton Rubber Manufacturing Co., Dayton, Ohio, will vote on a proposal to split the company's common stock two for one at a special meeting to be held on January 3. The purpose of the proposed split, according to A. L. Freedlander, company president, is to secure wider and more adequate investor interest and participation in the common stock. If approved, the par value of the common stock will be reduced from $1.00 to 50c per share to permit the books to show the same declared value as heretofore, and the authorized number of common shares will be increased to 900,000. The Class A stock will remain unchanged.

Buys Manchester Building

Purchase of a building in Manchester, N. H., for the production of "Lastex" yarn and rubber heels has been announced by the U. S. Rubber Co. The building, purchased from Amoskeag Industries, Inc., has been occupied under lease by the company since March, 1944, and was used during the war in the production of Army and Navy life vests and other war products. The plant now employs 350 people and 150 more are needed, according to Carroll C. Gerrish, local manager.

A Word of Explanation On the Lateness of RUBBER AGE . . .

We believe that our readers and advertisers are entitled to know why RUBBER AGE has been coming out so late in recent months. For the past year or so each issue has been from ten days to three weeks late—a fact which has caused much criticism and given us considerable uneasiness.

The fundamental cause for the delay has been the inability of our printers to turn out, with the available manpower and equipment, the greatly increased volume of work with which the whole printing industry has been flooded in recent years. There is hardly a printer in the country who has not been working at capacity for the past three or four years to keep up with the needs of their regular customers and the added work due to special war printing—all with depleted staffs and no new equipment.

Our own printer, who prints RUBBER AGE and the RUBBER RED BOOK, has large plants in three different cities and prints over 150 of the country's leading trade, technical and business journals—weeklies, monthlies and annuals. However, despite every effort to get replacements for the men who joined the Armed Forces, he has been unable to give us, or any of his customers, the prompt service to which we were accustomed in normal times. Practically every magazine today is larger than ever, more color is being used and in general the demands on the printer have far exceeded his capacity to turn out all the work offered him.

So much for past difficulties.

Conditions are beginning to improve, with more former employees returning to work and the burden generally beginning to lighten somewhat. However, we do not expect to get back to our regular schedule for a few months yet. Indications are that shortly after the first of the year the present situation will begin to ease up and we will be able to catch up a few days every month until we get back to our publication date of the 15th of each month as in the past.

We trust our readers and advertisers will, therefore, bear with us a while longer. We are making every effort, with the cooperation of our printer, to get back to our regular schedule and to give the rubber industry the prompt service to which it is entitled.

NEW YORK, December 1, 1945

The PUBLISHERS

CANADIAN NEWS

Hon. C. D. Howe, Minister of Reconstruction, announced on December 1 that rationing of all used and retreaded tires and virtually all truck tires except those in passenger car sizes had been lifted.

Car owners in class B who were previously eligible only for used or retreaded tires now will be eligible for new tires but for the next three months, depending on tire supplies, they may be limited to two new tires. Included in class B are bond and insurance salesmen, wholesale commercial travelers, chain store supervisors, finance company collectors, tax collectors and assessors.

Certain sizes of farm implement tires were also removed from the ration list. Truck tires in sizes 6.00x20-30x5, 6.50x20-32x6-8 ply, and 7.00x20 and over were freed from rationing and no permit is required for their purchase. Dealers, however, will still not be allowed to give or make any allowance for any used tire or tube taken in exchange for a new tire. Light truck tires in sizes 6.00x16-17x20; 6.50x16-17x20; 7.00x15-16x17 and 7.50x16 will continue to be rationed under the present system.

All sizes of farm implement and tractor tires other than all 16-inch sizes, 5.25x21 and 6.00x20, were freed from rationing for replacement and changeovers but must be sold for and mounted on a tractor or implement.

Mr. Howe already is on record as saying tires are likely to be in good supply with rationing lifted by spring. Synthetic rubber is in fairly plentiful supply but it is not yet known definitely when crude will be readily available. The problem in tire manufacture is one of fabrication rather than rubber.

When automobiles start rolling off assembly lines, the first cars will go to essential users such as doctors and a priority system has been set for that purpose. That system is likely to continue until the priority needs are met and how long that lasts will depend largely on the time taken to manufacture the cars. Return of the Canadian automobile industry to peacetime production has been delayed by current strikes.

Courtaulds (Canada), Ltd., announced on December 9 that early next year there would be a substantial reduction in the production of high tenacity rayon yarn with a proportionate increase in output of weaving and knitting yarns. The company also announced that the erection of a new plant for the manufacture of rayon staple fiber would start next spring as soon as the frost was out of the ground and building materials were available.

In a recent report on the subject of fire prevention, Raymond Pare, director of the Montreal Fire Department, pointed out that the great advances in the use of plastics and other new materials that have been developed during the war period are likely to result in a considerable number of new fire hazards.

"There are new materials and new methods of using old materials," his report stated, "which may be the cause of tragedy if developed without suitable study of fire prevention methods to be adopted for their use. Just what the field of plastics and synthetic rubber may develop to or what hazards they will involve are questions that have already had much consideration and will need more study."

Employing approximately 1,300 workers to produce about 50,000 long tons a year, the government's synthetic rubber plant at Sarnia is running at full blast with no present prospect of a decrease in production. According to an official of the company, Polymer Corp., Ltd., is still producing about 85% of Canada's rubber requirements.

Shutting down of all rubber-from-alcohol operations and alcohol-butadiene plants in the United States was, he stated, "a straight economic move." Butadiene, one of the main ingredients of synthetic rubber, is produced either from alcohol or petroleum. Made from alcohol it costs approximately 35 to 40 cents a pound—and only about one-third of that to manufacture it from petroleum.

"At Sarnia, we make butadiene from petroleum," the official said. "If it were not for the Polymer plant, Canada would be flat on its back in terms of rubber. Manufacturers are faced with a variety of uncertainties in the production of natural rubber. What will the price be? For instance, if it is too high, manufacturers would go on using a lot of Buna—synthetic rubber made from butadiene and styrene, the other chief ingredient. The future of natural rubber is not yet clear."

Dominion Rubber Company, Ltd., recently announced the appointment of Ralph M. Ferguson as assistant to the general manager of the Chemical and Regenerating Division of the company. Mr. Ferguson was associated with the St. Lawrence Chemical Co. in Toronto for 12 years before joining Dominion Rubber in 1941, when he was sales and service manager of the Naugatuck Chemicals division of the company at Elmira, Ont., prior to his recent appointment. He will be located at the company's head office in Montreal.

Alan R. Clark has joined the technical sales staff of the Naugatuck Chemicals Division of Dominion Rubber Co., Ltd., Elmira, Ont. Mr. Clark, formerly with the St. Lawrence Chemical Co., Toronto, is well known in the rubber, paint and chemical industries in Toronto and districts. He will devote his attention to the sale of rubber chemicals in the provinces of Ontario and Quebec for Dominion Rubber.

Ralph M. Ferguson
assumes new post with the Dominion Rubber Co., Ltd.

Canada's exports of rubber and waterproofed clothing, which in October, 1944, were valued at $36,910, declined to $14,362 in October this year, according to a report of the Dominion Bureau of Statistics.

Goodyear Tire & Rubber Co. of Canada announced the following executive appointments on December 1: C. B. Cooper, assistant general sales manager; S. R. Skelton, assistant general sales manager; E. W. Hayter, manager, advertising department; F. G. Wilmot, manager, dealer development department: G. F. Turner, manager, automobile tire department, and N. E. Irwin, manager, oil company sales department.

The Goodyear Tire & Rubber Company of Canada continues busy at all its factories and officials expect no major lay-offs of employees in the future due to conversion from war to peacetime products, A. G. Partridge, president, recently informed stockholders. Synthetic rubber is available in adequate quantities and the company will be able to use all the crude it can get for the next two to three years, at least. Almost every automobile owner in Canada is now a prospect for four to five tires and tubes and it will take some time to satisfy this demand.

"This means continued production at full capacity," said Mr. Partridge. In addition the company expects to be manufacturing a number of new rubber products, some of which have been developed during the war. Many of these new products can be made from various types of synthetic rubbers, according to Mr. Partridge.

Quebec Schedules Meetings

The Quebec Rubber and Plastics Group has announced its scheduled meetings for the next few months. "Ladies Night" was to have been held on December 13, with Dr. Marie Bentivoglio, of the Celanese Corporation of America, scheduled to deliver an address on "What Can We Expect from Plastics." B. W. Kneightley, advertising manager of Canadian Industries, Ltd., will be the principal speaker at the January 11th meeting, his topic being "The Use of Advertising in Helping to Create Sales for New Products." A talk on "Color" will be given by C. R. Conquergood, of the Canada Printing Ink Co., Ltd., at the meeting to be held on February 8, which will be a joint meeting with the Paint and Varnish Production Club of Montreal. The March 8th meeting will have C. L. Jones, of the Plastics Division, Monsanto Chemical Co., as the principal speaker, but neither speaker nor subject has been selected as yet for the April 12th meeting. The meeting to be held on May 10th will feature a "Technical Symposium" in which all members will participate. All meetings of the group are held at the Ritz-Carlton Hotel in Montreal.

Baker Adds to Research Staff

The J. T. Baker Chemical Co., Phillipsburg, N. J., recently announced the appointment of four research chemists to its technical staff. The appointments include: Dr. Werner Baumgarten, a graduate in biochemistry from the California Institute of Technology, who was formerly associated with Hiram Walker & Sons, Inc., Peoria, Ill.; Dr. John H. Gardner, formerly associate professor of chemistry at Washington University, St. Louis, Mo., who received his doctorate from the University of Illinois; Dr. Remsen Schenck, a graduate of the University of Chicago, who was working on atomic power in the metallurgical laboratories; and Dr. Harold Schedl, who is receiving his doctorate from Yale University this year.

Offer New Rubber Digest

Announcement of a weekly news reporting service devoted to rubber, synthetic rubber and allied products has been made by H. I. Harwood, 299 Madison Ave., New York 17, N. Y. Mr. Harwood, who is publisher and managing editor of *Plastics and Resins*, a monthly journal devoted to the plastics industry, plans to issue the "Rubber Digest and Newsletter" in the form of a weekly four-page letter which will be mailed each week-end by first class mail, or by air mail at an additional cost. It is planned to furnish information on new developments, chemicals, processes, materials, applications, people, etc. Subscription price to the service will be $50.00 per year.

Acquires Rayon Cord Plant

The U. S. Rubber Co. has announced the purchase of the rayon processing plant at Scottsville, Va., at a price of $1,837,500. It has been operating the plant on lease from the government. The plant was built by the Defense Plant Corp. in 1944 at a cost of approximately $2,300,000. Designed to produce 1,200,000 pounds of tire cord per month, it is now exceeding that rate by 700,000 pounds as a result of time-saving methods instituted by the company, and it will continue to operate at capacity with the present payroll of 350. The purchase of this plant increases to seven the number of textile mills owned by U. S. Rubber.

Forms Associated Machinery

Sidney M. Fauer, formerly general sales manager of the United Rubber Machinery Co., Newark, N. J., has opened his own office and warehouse for the sale of used and rebuilt rubber and plastic machinery and equipment, operating under the trade name of Associated Machinery & Products, 60 Branford Place, Newark 2, N. J. Mr. Fauer also states that the new company will act as sales representative for the Erie Engine & Manufacturing Co.

FINANCIAL NEWS

Anaconda Wire & Cable Co.

First Nine Months: Net income of $640,503, equal to $1.52 each on 421,981 capital shares, which compares with $922,770, or $2.19 a share, reported for the first nine months of 1944. For the third quarter of the year the company reported a loss of $5,156, before taxes and contingencies, which compares with net income of $223,896, or 53 cents a share, for the third quarter of the preceding year.

O'Sullivan Rubber Corp.

Eight months to August 31: Net income of $145,518 based on net sales of $4,929,978. For the year ended December 31, 1944, the revised net income of the company amounted to $176,543, based on sales of $6,927,710. O'Sullivan Rubber Corporation is the successor to the former O'Sullivan Rubber Co., Inc.

Thermoid Company

First Nine Months: Net profit of $552,346, which is equal to 77c a common share, and which compares with $581,180, or 86c a common share, for the corresponding period of 1944. Third Quarter: Net profit of $51,297, or 3c a share, against $257,107, or 39c a share, for the third quarter of 1944.

German Cartel Survey

A comprehensive economic survey disclosing for the first time the methods of operation of I. G. Farbenindustrie, the German cartel, has recently been made available for distribution to the public by the U. S. Department of Commerce. The survey, which was prepared under the direction of Lt. Col. A. E. Link of the Army's Chemical Warfare Section, includes data on the organization's output of synthetic rubber, chemicals, dyestuffs, pharmaceuticals, and other products. Also included are organizational charts giving key jobs and personnel of the central organization and of production and sales groups, as well as information on the cartel's position within the German chemical industry, its sales organization, prices, and expenditures on research and new plants. The survey is available in microfilm form at a charge of $6.00. Four supplementary rolls, in the original German, are also available at $24.00. Checks should be made payable to the Treasurer of the United States and should be forwarded to the Publication Board, U. S. Department of Commerce, Washington 25, D. C.

Open New Boston Office

The Binney & Smith Co., manufacturers and distributors of carbon blacks, colors, clays, chemicals and other materials, with headquarters at 41 East 42nd St., New York 17, N. Y., has opened a new sales office in the Park Square Building, Boston 16, Mass. The new office, with Allan W. Bryant as resident manager, will service the New England area with the exception of Connecticut, which will be served from the New York offices. Previously, Binney & Smith sales in the New England area were handled through sales agents.

High Polymer Group to Meet

The second regular meeting of the Division of High-Polymer Physics of the American Physical Society will be held at Columbia University in New York City on Jan. 24, 25 and 26, in conjunction with the annual meeting of the parent society. Approximately 25 papers on rubbers, plastics, and other high polymeric materials, covering the analysis of physical behavior and experimental techniques, will be presented at the Division's sessions.

Goodrich Plans Plastics Plant

The B. F. Goodrich Co., Akron, is planning the construction of a new plant near Marietta, Ohio, at a cost of approximately $4,000,000, for the processing of plastics. The plant will be located on a 66-acre tract on the west bank of the Muskingum River and the main building will contain 112,000 square feet with auxiliary and service buildings adding another 48,000 square feet. When completed, the plant is expected to employ about 250 workers.

OBITUARIES

Harry G. Fisk

Harry G. Fisk, one of the founders of the old Fisk Rubber Co., Chicopee Falls, Mass., now the Fisk Division of the U. S. Rubber Co., died at his home, 111 Maple St., Springfield, Mass., on November 30. He was 72 years of age.

Mr. Fisk was born in Springfield on May 5, 1873, the son of Noyes W. and Emeline G. Adams Fisk. After attending the local schools and the Massachusetts Institute of Technology, he became associated with the Davis Electrical Works. In 1898 when his father took over the Spaulding and Pepper Co. and established the Fisk Rubber Co. for the manufacture of bicycle tires and other rubber goods, he joined the firm as secretary, also becoming assistant treasurer a short time afterward. In 1912 he was made treasurer, and in 1921 vice-president.

In addition to his activities in the rubber industry, Mr. Fisk served at various times as president of the Knox Motor Co. and as an official of the Hodges Carpet Co., Connecticut Valley Realty Co., Springfield Brick Co., and the Agawam Racing and Breeding Association, while at the time of his death he was an executive of the Union Trust Co. and a director of the Massachusetts Mutual Life Insurance Co. He was also a founder of the Eastern States Exposition, and he directed the activities of the Eastern State Farmers Exchange from its inception in 1918 until 1921.

Active in civic and social affairs, he was the donor of the Fisk Cup, which was awarded yearly in an automobile durability race, served as chairman of the Springfield food-conservation program during the first World War, and was a member of numerous clubs in Springfield and elsewhere. He was also active in Masonic circles, belonging to the Springfield Lodge of Masons, Morning Star Chapter, Royal Arch Masons, and the Springfield Commandery of Knights Templar. Mr. Fisk is survived by two sons and a daughter.

R. H. Comley

Rowland H. Comley, joint managing director of the Avon India Rubber Co., Ltd., Melksham, Wilts, England, and president of the Federation of British Rubber and Allied Manufacturers' Associations, died on October 13 after a short illness. Mr. Comley entered the rubber business in 1906 when he joined the Sirdar Rubber Co., which was absorbed by the Avon India Rubber concern in 1916. He served with the British Army throughout the length of the first World War and returned to the company at its conclusion. Always active in sales he eventually became director of sales for the company, and in 1942 he was elected to the board and made joint managing director. In addition to heading the Federation, he was also an active member of several other rubber and allied organizations in England.

Elmer W. Berg

Elmer W. Berg, president of the Lavelle Rubber Co., Chicago, Ill., one of the largest distributors of rubber products in the midwest, died at his home in Itasca, Ill., on October 13 at the age of 58. Mr. Berg was born in Chicago on August 22, 1887. He served with the U.S. Rubber Co. in a sales capacity from 1901 to 1920, joining Lavelle Rubber as treasurer in the latter year. He became president of the company in 1943. A Mason, Mr. Berg was a member of the Medinah Temple, the Itasca Lions Club, and the Chicago Rubber Group. A widow, son and daughter survive.

Hold Velon Fashion Show

The first fashion show of evening apparel processed from Velon, the new plastic yarn developed by the Firestone Tire & Rubber Co., Akron, during the war, was recently held at the Ritz Carlton Hotel in New York City. Turbans, tunics, evening gowns, shoes and accessories of colorful design were among the many exhibits shown. Since the color of Velon is compounded into the original formula and becomes an integral part of the filament itself, it is commercially sun-fast and fade-proof, and can be cleaned with soap and water or any ordinary cleaning fluid. Velon is available in deep, rich primary colors or in unlimited pastel shades and brilliant hues, which may be transparent, translucent, opalescent, or opaque, as desired. It is resistant to ordinary chemical solvents, is rust-proof, waterproof, weather-proof, non-combustible, tasteless, odorless and non-toxic, is impervious to body perspiration, and can be sewed, cemented or heat-sealed.

Largest Bomber Tire

Officials of the Goodyear Tire & Rubber Co. have revealed that the largest bomber tire in the world, built at its Akron factories, was almost ready to have been used to help force the capitulation of Japan just prior to the actual surrender of that country. The bomber tire, which was to have been used on a new super bomber, is the largest and heaviest ever produced in this country. Measuring 110 inches in overall diameter, 44 inches across the beads, and 36 inches from one sidewall to another, the complete assembly weighs 2,600 pounds. Weight of the tube alone is 250 pounds.

CHEMICAL INSTITUTE OF CANADA FORMS SPECIAL RUBBER DIVISION

The Board of Directors of the recently-organized Chemical Institute of Canada has authorized the formation of a Division of Rubber Chemistry. Officers of the new Division are: *Chairman,* N. S. Grace (Dunlop, Toronto); *Vice-Chairman,* G. R. Smye (Firestone, Hamilton); *Secretary-Treasurer,* H. G. Deline (Dunlop, Toronto). Executive members include R. E. Hatsch, Polymer Corp., Sarnia), J. C. Howard (Kaufman Rubber, Kitchener), and A. B. Lewis (British Rubber, Montreal).

The major function of the newly-authorized Division is to arrange programs for the technical session at the annual Chemical Conference. The next conference is to be held in Toronto, the latter part of June, 1946, and the officers are already making arrangements for the program. Anyone interested in joining the Division or in presenting a paper at the technical session can obtain further details by writing to Mr. Deline.

Report Tests on Butyl Tubes

In comparative tests recently conducted by the U. S. Rubber Co., two identical tires were mounted on a car and inflated to the same air pressures, one tire mounted with a Butyl tube and the other with a natural rubber tube. Both were punctured with 3/16-inch nails which were allowed to remain in the tires, and the tires then run on the car for 91 miles. At the conclusion of the run, the tire containing the Butyl tube still had 25 pounds of air pressure, while the tire with the natural rubber tube was flat. Furthermore, it is reported, after standing overnight under the weight of the car, the Butyl tube still had 10 pounds of air the next morning.

Exposition Is Shaping Up

Over 300 exhibitors who showed at the last exposition in 1941 are already on the roster of the 20th Exposition of Chemical Industries, which is to be held in Grand Central Palace, New York, February 25 to March 2nd, next. The number of exhibitors signed to date, plus those expected to arrange for exhibition space soon, will top the old one by a considerable number. Because of the large professional attendance anticipated, admissions will be restricted to visitors by invitation and registration at the door, thus excluding the general public.

Albert Opens Chicago Office

The firm of L. Albert & Son, dealer in new and rebuilt rubber and plastics machinery and equipment, with headquarters in Trenton, N. J., recently opened an office in Room 1365, 120 So. LaSalle St., Chicago 3, Ill., to take better care of the requirements of the company's customers in the mid-west area.

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The resultant damage from a fire in this pumping station must be calculated, not only in terms of actual physical loss but also in terms of losses resulting from the interruption to plant operations.

Whether started from a cracked fitting, faulty pump packing, leaky flange or similar cause—fires of this type have sent flames rocketing to alarming proportions and intensity within the space of a moment.

Matching the speed and ferocity of the fire, with the instant starting and control obtained, "Automatic" FIRE-FOG offers the modern effective means of combating this serious threat to plant operations.

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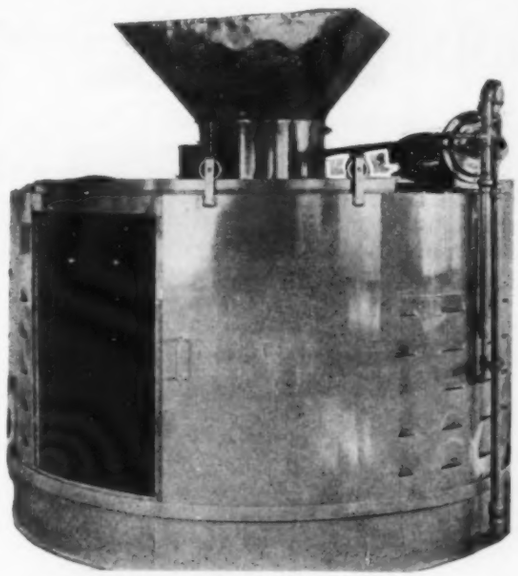
"Automatic" Sprinkler manufactures and installs a complete line of fire protection devices and systems for all types of fire hazards. Listed by Underwriters' Laboratories, Inc., and approved by Factory Mutual Laboratories.

NEW EQUIPMENT

Latex Frothing Machine

The American Machine & Foundry Co., 511 Fifth Ave., New York, N. Y., makes a wide variety of mixing machines adaptable to various industries. One of these mixers, the AMF Glen "340" Mixer, has been especially adapted to latex foam work and is already installed in several rubber plants producing latex foam

products. The accompanying illustration depicts one of these mixers equipped with a special wire whip which adapts it to latex foam work. The planetary action and the new "precission ratio" mixing action of the model, in conjunction with the special whip, build up the full, uniform, cellular structure required for this type of work. The beater spindle, turning at controllable rates of speed in the opposite direction to the revolving head, creates a planetary action which is said to quickly and thoroughly assimilate the combinations of material. The wires of the whip sweep through all parts of the mix. The principle of "precission ratio" makes it possible to stop the mixer head (shown in the illustration in a raised position) while the beater continues to revolve in the batch. A vortex is created into which the jelling agent is poured and completely incorporated in the batch to the very bottom of the bowl (shown in lowered position). The bowl is attached to a dolly which can be easily removed while a preloaded bowl is moved into position. The Glen "340" has a variable speed from approximately 45 to 325 r.p.m. of the agitator.



RUBBER SLAB COOLER

The mill room equipment at the left is used to lubricate cool and dry rubber slabs having been hand cut from a rubber mixing mill. Do that job for less money, in less floor space with cleanliness around your mills.

Simple to operate, practically no maintenance or care required.

Set in required location. No anchor bolt necessary. Connect electrical line, water and drain. It is then ready for operation. FURTHER DETAILS UPON REQUEST.

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Commercial Rubbermakers' Sulphur, Tire Brand, 99½% Pure
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Carbon Tetrachloride, Carbon Bisulphide
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*Copperas
Cream of Tartar
Chlorine
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Nitric Acid
Silicon Tetrachloride
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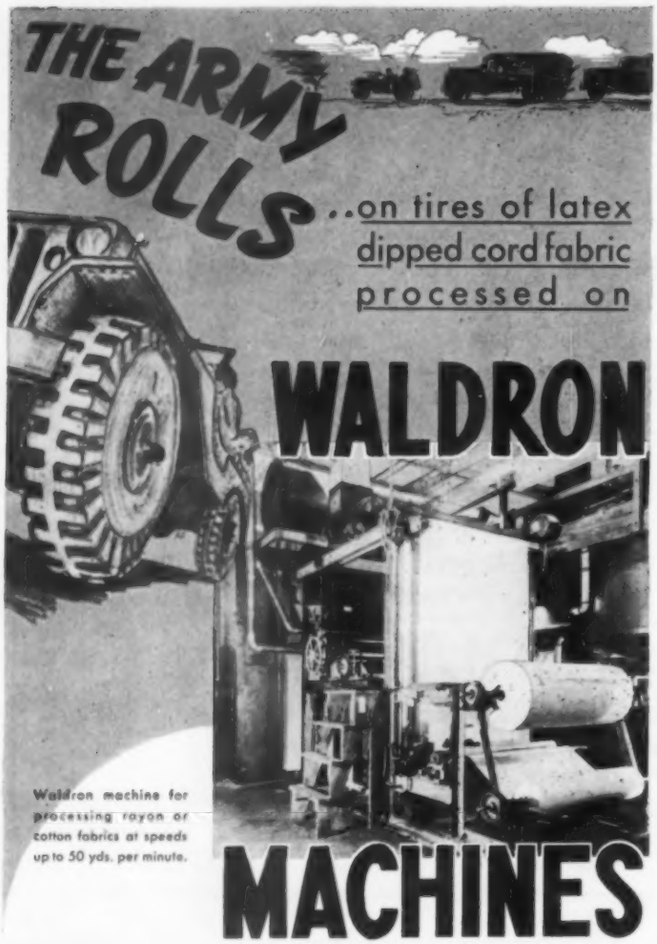
THE ARMY ROLLS
..on tires of latex dipped cord fabric processed on
WALDRON
Waldron machine for processing rayon or cotton fabrics at speeds up to 50 yds. per minute.
MACHINES

IT isn't significant that WALDRON is engaged in such vital war work. That is the job for all of us. What is significant is the fact that practically all the tires on which the Army rolls are made with cord or fabric specially processed on WALDRON* machines. Millions of tires bear the names of many famous makers but this processing equipment in their plants throughout the world bears the same name—WALDRON*.

Among the Famous Makers Operating Waldron* Processing Equipment Are

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New Preco Hydraulic Press

Featuring several improvements in design and operation, an improved hydraulic press, called Model PA6, has been introduced by Preco, Inc., 960 East 61st St., Los Angeles 1, Calif. This press is applicable for production work on rubber, plastics, laminations, powdered metal, etc., as well as for testing and general

Improved Preco Press

laboratory and research work. The press produces a 40,000-pound platen pressure through a two-stage hydraulic pump—a long stroke for quick closure and a short stroke to develop the desired pressure. Design improvements in the hydraulic system including the use of a cone valve fitted with an "O" ring seal have produced better efficiency and smoother operation of the press. The press platens, which are 8" x 8" and open 8", are electrically-heated and water cooled. A 750-watt element in each platen provides fast heating up to 600°F. Heavy insulation prevents heat loss.

FOR HIGH TENSILE, USE PHILBLACK A

(FOR FURTHER DETAILS, SEE AD ON PAGE 272)

New Stock Cooling Rack

THIS New Rack offers a convenient method for storing materials that require cooling or air drying.

- **Rack can be either stationary or mounted on casters.**
- **Trays have perforated metal surface and can be spaced to suit.**
- **Standard Rack has eighteen trays 36" x 36" spaced 2⅝" apart.**

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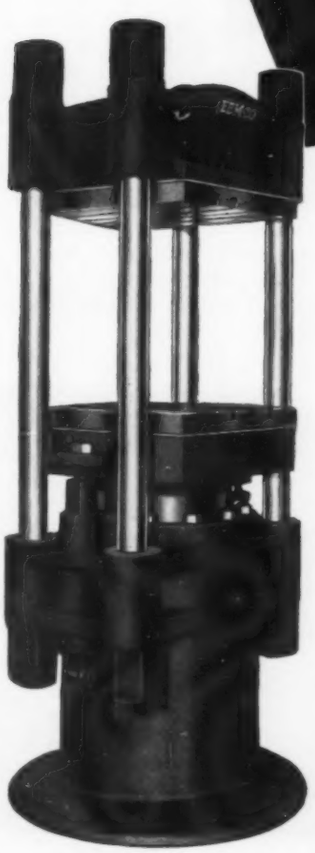

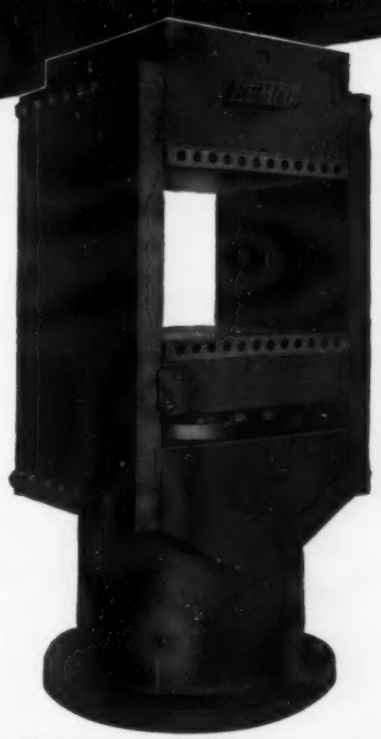

Manufactured in all sizes, EEMCO hydraulic presses are furnished with or without self-contained pumping units or special features. Built for heavy duty and especially designed to save you money on maintenance and operating costs. It will pay you to consult with EEMCO engineers on all rubber and plastics processing machinery needs.

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Leslie Air Reducing Valve

A new improved type of internal pilot operated air reducing valve, known as Class L-1A, reported to provide steady, accurate regulation and tight closing in dead-end service, has been announced by the Leslie Co., Lyndhurst, N. J. Among the main features of this new valve are its stability under all flow conditions and its responsive instant reaction to widest and most sudden variations in load. Plastic inserts in the valve seats provide positive tight shutoff and long life. All wearing parts are renewable and complete interchangeability facilitates overhauling without removal from the pipe line. Corrosion and wear resistance, another feature, is obtained by the use of stainless steel main valve, bronze controlling valve and corrosion resistant piston rings. The new valve is available in sizes ½" through 4" inclusive, designed for initial pressures up to 400 air pressure and reduced pressures from 5 to 300 p.s.i. A similar valve designed particularly for accurate control of small air valves is known as class JA-1 in ¼", ⅜" and ½" size and is similar in construction except that a neoprene diaphragm is used in lieu of the bronze piston.

Magnetic Adjustable Speed-Drive

Precise, wide-range, quick-response speed control for centrifugal pumps, blowers, compressors, and boiler draft fans, is said to be provided by the new E-M Magnetic Adjustable-Speed Drive introduced by the Electric Machinery Mfg. Co., Minneapolis 13, Minn. Consisting of but two operating parts, a rotating ring and a rotating magnet, the drive is a compact, self-contained, electro magnetic torque transmitter used in combination with a constant speed a-c motor and an electronic controller to provide split-revolution speed control. Built in ratings approximately 25 hp. and larger at 1800 to 600 r.p.m., the drive is available in several forms to meet the requirements of new or existing installations. It provides substantial power savings by operating boiler draft fans at reduced fan speed for partial fan output, eliminating the need for damper or inlet vane control. Life of induced draft fans operating in erosive gases is greatly increased due to use of reduced speeds at partial fan outputs. The new drive can be used in combination with synchronous motors to provide power factor correction.

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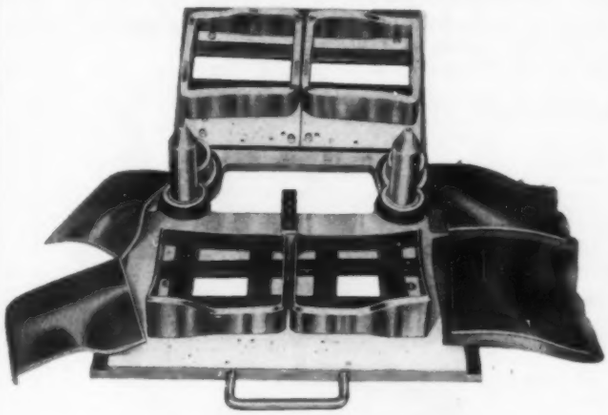

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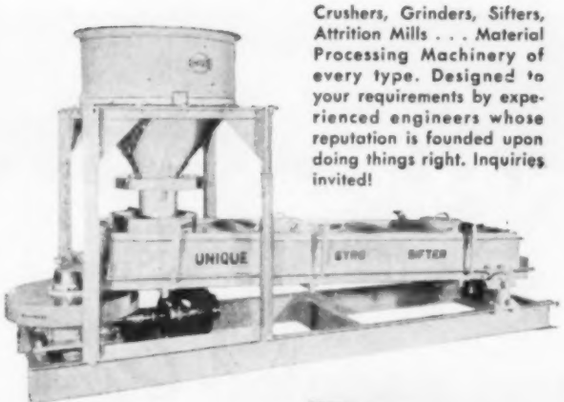

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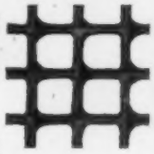
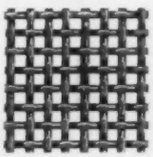
Precision Wire Cloths

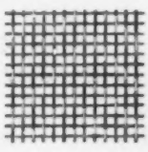


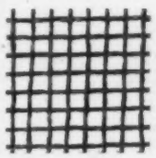
and Screens for Rubber Strainers, sifters, filters and similar process equipments.

We have been specialists for many years in the making of precision wire cloths, wire screens and woven wire products.

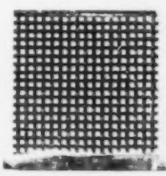


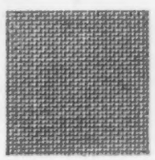
We apply our same precision principles in fabricating wire cloths into finished industrial units, for production or processing equipments or for permanent parts of countless industrial products.





We invite your inquiries for wire cloths of all commercial metals or alloys or weaves, in continuous lengths or cut to size, or processed to meet your individual requirements.





We will follow your specifications and blue-prints exactly as your production engineers have prepared them—or we will submit suggestions for your approval.

"Perfect" alloys and metals	"Perfect" Wire Cloth weaves	"Perfect" Wire Cloth processing	"Perfect" Wire Cloth products
Super-Loy	Arch-Crimp	Bending	Baskets
Steel	Coiled	Binding	Circles
Galvanized	Double-Crimp	Brazing	Cones
Tinned	Double-Fill	Calendering	Crates
Stainless Steel	Dutch	Clinching	Cylinders
Nickel-Chromium alloys	Filter	Cutting	Discs
Aluminum	Flat-Top	Dipping	Forms
Brass	Herringbone-Twill	Dishing	Leaves
Bronze	Intermediate-Crimp	Flanging	Lengths
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Copper	Selvage-Edge	Forming	Pieces
Monel Metal	Straight-Warp	Framing	Racks
Nickel	Stranded	Galvanizing	Ribbons
Any special alloys available in rod or wire form	Sta-Tru	Painting	Rolls
	Triple-Warp	Shearing	Sections
	Twilled	Slitting	Segments
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The LUDLOW-SAYLOR WIRE COMPANY

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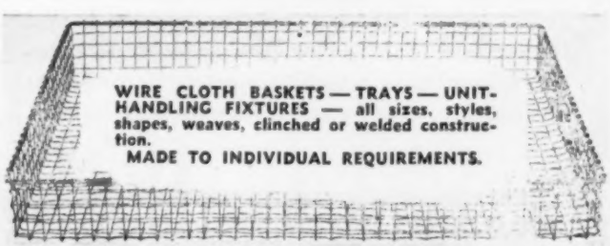

WIRE CLOTH BASKETS — TRAYS — UNIT-HANDLING FIXTURES — all sizes, styles, shapes, weaves, clinched or welded construction.

MADE TO INDIVIDUAL REQUIREMENTS.

WHATEVER YOU MAKE,
IF OF NATURAL RUBBER
OR A SYNTHETIC, IT WILL
PAY YOU TO PROTECT
AND IMPROVE IT WITH
FRANKLIN'S
F77
Rubber Dressing

Franklin's F 77 imparts a beautiful lustrous finish to all rubber goods, makes them last longer and look better. It contains no volatile solvents, is odorless, non-toxic, non-inflammable. Can be sprayed, wiped or dipped.

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A full line of maintenance materials

Eureka Tablet Compressing Machine

The F. J. Stokes Machine Co., Philadelphia, Penna., has introduced an improved model of the Eureka tablet compressing machine, which is used in making test pellets and in proving various industrial specialties. Improvements include a more efficient feeding device for

View of the Eureka Compressor

handling materials difficult to feed, an ejection cam machined to give smoother action, and an improved adjustment of the lower plunger which enables the press to make very small tablets. Applying pressure of 1½ tons, with a maximum die-fill of 7/16-inches, the press produces tablets up to ½-inch diameter at rates up to 100 per minute. A core-rod attachment can be provided to make cored pieces. The bench space of the machine is 12 x 18 inches, while the height is 24 inches. Powered with a ¼ h.p. motor, the machine is also available without the motor, for hand operation, and it can be obtained with a variable speed drive to handle various size tablets in runs of considerable length.

FOR LOW HEAT BUILD-UP, USE PHILBLACK A

(FOR FURTHER DETAILS, SEE AD ON PAGE 272)

SIMPLEX
REG. TRADE MARK

RUBBER STRIP CUTTER

PATENTED

A PORTABLE machine capable of stripping slab rubber up to 1" thick at the rate of 20,000 feet in 8 hours. Any width desired.

SPECIAL FEATURES

- Has micro-adjustment for accurate widths.
- Equipped with water tank which feeds water to the slotted knife and to the cut.
- Has repulsion-induction motor which carries any overloads.
- Automatic sharpener device keeps knife keen and sharp.
- Has base with rollers and is very easy to handle.

Cuts within 1/64 inch to 1/100 inch tolerance depending on grades of rubber. Cuts a slab down to the last shaving. Cuts all grades of rubber including pure gum, sponge, etc. Cuts squarely—no rejects.

Now in use by many leading Rubber Manufacturers & Jobbers

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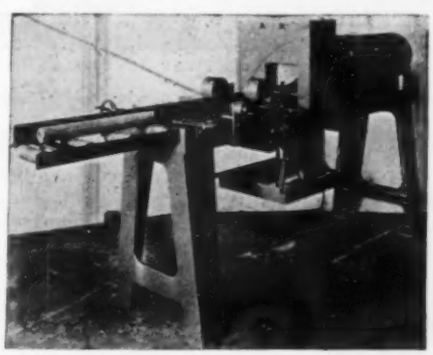

With High Speed Disc Cutting Blade, Automatic Feed and with Tandem Feed Wheels. Capacity Section Up to 3" by 4½"—Length ⅛" to 4".

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If you own a Scott Tester, CUT OUT THIS DATA SHEET, No. 1 of a series, and pass it along to your maintenance man.

MAINTENANCE DATA SHEET NO. 1

CALIBRATION OF SCOTT TESTERS

The recording head of an inclinable balance Scott Tester is in reality a weighing scale. However, it works in one direction only, so that it cannot balance back and settle into position if the weight is dropped or otherwise applied too abruptly.

To calibrate, have available a weight of known amount. Balance the machine by allowing the pendulum lever to swing to its normal position, dead center, and adjust the pointer to zero on the dial. Attach the known weight to the upper clamp, which is connected to the chain of the recording head. (In computing the amount of the known weight, include the weight of all apparatus used to attach it.)

Allow the weight to exert its force by lowering gradually by hand. Do not drop it, but do not lower too slowly. Use the speed at which stress is applied in an actual test. The pointer should register upon the dial the exact amount of the known weight plus the attaching apparatus.

The pawls must be in the same position on the quadrant racks as in actual testing. The weight must be attached without binding or friction that would prevent the full force registering on the dial. The weight may be a pail of water, a bolt of cloth, a roll of paper, sash weights, etc. Whatever the weight, it MUST be accurately weighed.

Every Scott Tester is fully tested and calibrated at the factory, therefore, it is safe to assume that accuracy at any one point of the dial indicates a correct machine at all points.

The many Scott Testers supply the needs of testing textiles, rubber, wire, paper, etc., up to 1 ton tensile.

REQUEST "CATALOG & DATA BOOK NO. 45"

SCOTT TESTERS, INC.

85 Blackstone St., Providence, R. I.

how chemistry's war-born progress affects

Never before have such profound changes taken place in chemical industry—with so few details generally publicized—as in the war years just past.

New techniques, new materials, new equipment, whole new chemical industries have sprung into being. Much has happened which, for security reasons, could not be revealed until now.

Here is your opportunity to see and hear how peacetime applications of war-born changes may affect your plants, your markets, your profits. It's the 20th Exposition of Chemical Industries, which will be held at Grand Central Palace in New York City, February 25-March 2, 1946.

What you will see at the exhibits, what you can learn there by talking with exhibitors' technical representatives, may shape your thought and actions for months to come.

For every chemist, chemical engineer, and production head throughout industry, this year's Exposition is—more than ever before—a "must". No executive responsible for the future of any business depending on chemical process, in his own or customers' plants, can afford to pass it up.

Attendance will pay you well. Be there with your associates!

20TH EXPOSITION OF CHEMICAL INDUSTRIES
FEB. 25 - MAR. 2
GRAND CENTRAL PALACE
NEW YORK CITY

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Management of International Exposition Co.

REVIEWS

BOOKS

Major Instruments of Science and Their Applications to Chemistry. Edited by R. E. Burk and Oliver Grummitt. Published by Interscience Publishers, Inc., 215 Fourth Ave., New York 3, N. Y. 6 x 9 in. 151 pp. $3.50.

This is Volume 4 of the series of "Frontiers in Chemistry" being published under the auspices of Western Reserve University. This series is composed of lectures presented by leading experts in various fields and their publication makes them available to a much wider audience. The current volume contains six lectures, as follows: Electron Diffraction and the Examination of Surfaces, by Lester H. Germer; The Electron Microscope and Its Applications, by L. Marton; X-Ray Diffraction and Its Applications, by Maurice L. Huggins; Chemical Spectroscopy, by Wallace R. Brode; Application of Absorption Spectra to Chemical Problems, by Wallace R. Brode; The Infrared Spectrometer and Its Applications, by R. Bowling Barnes. Brief biographies of each lecturer are given. A subject index is included.

•

Plastics (3rd Edition). By J. H. DuBois. Published by the American Technical Society, Drexel Ave. at 58th St., Chicago 37, Ill. 5½ x 8¼ in. 448 pp. $4.00.

The latest edition of this popular book has been completely revised and 16 additional pages incorporated, bringing up-to-date the data on plastics. The book explains in narrative and interesting form how various common materials and even waste by-products are put together to form the several plastics materials now available for use. It also gives an excellent historical account of all plastics and traces the discoveries, developments and experimentations. Although omitting formal chemistry, it explains what happens when certain materials are mixed and blended to form the known plastics. Like previous editions, the current one should prove useful to members of the plastics field, those using plastics in their manufactured products, and to teachers of the subject.

•

Directory of New England Manufacturers: 1946. Published by the George D. Hall Co., 30 Kilby St., Boston 9, Mass. 7¾ x 10¾ in. 770 pp. $25.00.

Issued with the editorial cooperation of the New England Council, the latest edition of this directory, the tenth to be issued and the first since 1942, has been completely revised and brought up-to-date. It is replete with information on New England, and features an alphabetical section, in which detailed information is given on all New England manufacturing companies, including corporate personnel, a geographical section, in which the manufacturers are listed by city or town in which they are located, a product section, and a brand name section. In addition, information is contained on the organization and purpose of the New England Council, advantages of industrial locations in New England, engineering societies within the area, etc.

•

The Story of Linen. By William F. Leggett. Published by the Chemical Publishing Co., Inc., 26 Court St., Brooklyn 2, N. Y. 5 x 7½ in. 102 pp. $2.75.

As indicated by its title, this book is the story of linen from its earliest known use at the dawn of civilization, when spinning and weaving of flax was an important domestic activity among many of the world's people, to its present multitudinous applications. It covers linen in Egypt, Greece, Rome, Flanders, France, England, Ireland and Scotland, and discusses all of the base raw materials. The book is of particularly keen interest to the textile field.

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SEND FOR LOAD-SKID MANUAL No. 1006MH

Available in all sizes — capacities from 2500 to 20,000 lbs. Load-Skids may be purchased in steel, stainless steel, Monel metal, or hard wood, metal bound at vital points. Load-Skids and Load-Lifts combined make one of the most efficient materials handling and storage systems in existence.

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CAPITOL LINER PROCESS

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For Production Efficiency and Economy use

CAPITOL PROCESS

for your Rubber Repellent Liners.

Send us 50 or 100 yards of liner material. We will treat it without charge and return for testing in your plant.

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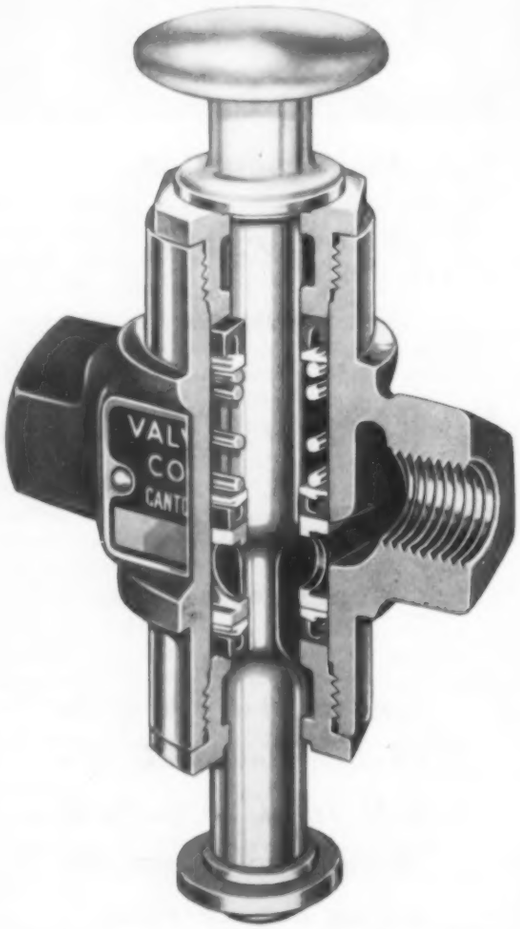
Originators of Liner

the Capitol Process

VALVAIR

TRADE MARK

AIR CONTROL VALVES



KNOB OPERATED VALVE SHOWN

Valvair valves are new in design and principle, standard valves have been operated more than two million times without leak with air pressure exceeding 100 lbs. They are designed for indefinite life and exceptionally hard service.

They are compact—they do not have metal seals—the body is made of cast bronze and steel parts are made of stainless steel—they will not corrode.

They are made in five sizes—¼, ⅜, ½, ¾ and 1 inch—and in two-way, three-way and four-way types. They can be furnished in eight or more different designs—knob, lever, foot, cam, clevis, single diaphragm, double diaphragm or solenoid operated.

They will control air efficiently up to 200 lbs. pressure with a very light movement. The area through the valves is equivalent to pipe size with minimum pressure drop. Write for literature.

THE SINCLAIR-COLLINS VALVE COMPANY
454 Morgan Avenue
Akron 11, Ohio

BOOKLETS, CATALOGS, Etc.

Friction Sawing. DoAll Co., 1301 Washington Ave. South Minneapolis 4, Minn. 6 x 8¾ in. 24 pp.

This booklet describes in detail a new technique for cutting materials known as "friction sawing" which was recently developed through the innovation of high-speed sawing machines, and sets forth its advantages and limitations. Photographs and charts are used to illustrate the cutting rates to be expected from friction sawing, including radii cutting factors, tube sawing, and finish, and numerous photographs are included which show various applications in foundries, experimental laboratories, production, maintenance and salvage work. Applications discussed include plastics, tubing, ferrous and non-ferrous casting, steel, etc.

•

Aluminum Applications by Industries. Aluminum Company of America, Pittsburgh 19, Penna. 8½ x 11 in. 160 pp.

This booklet consists of a list of approximately 3,500 applications for aluminum in the rubber, packaging, automotive, aircraft, textile, sports goods and other industries. Rubber industry applications listed include aeroplane brakes, cable, conveyors, couplings, latex collecting cups, tire building drums, flanges, dipping forms, hose, hydrated alumina for compounding, inserts, mandrels, molds, nipples, miscellaneous machine parts, tire retreaders, vulcanizer spacers, tanks, wheels, etc.

•

Friction Materials for Industrial Machinery. (Catalog No. 15). Raybestos-Manhattan, Inc., Passaic, N. J. 9 x 11½ in. 60 pp.

This new catalog describes the extensive line of friction materials manufactured by the company, including woven, folded and compressed, molded, semi-metallic and full-metallic, each made in a number of types and structural modifications to suit the specific needs of industrial equipment. Also included are descriptions of the company's laboratories and engineering facilities, as well as photographs of actual installations.

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STOCK SHELLS HOSE POLES
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• NON-DETERIORATING
RARE METAL PRODUCTS CO.
BELLEVILLE, N. J.

LITTLEJOHN & CO., Inc.

120 WALL STREET
NEW YORK 5, N. Y.

CRUDE SYNTHETIC
RUBBER

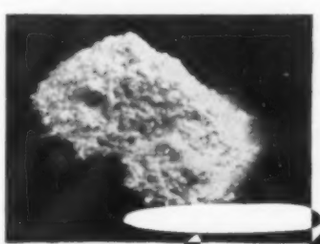
Synthetic Latex

Balata — Gutta Percha

Pontianak — Siaks

Chicle Gums

Worth Looking Into...



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For Non-Marking, Stronger Sole Compounds

Compounding with Rayco cotton flock reduces marking to a minimum in sole compounds, and greatly improves strength and tear resistance. Use with crude, synthetic and reclaim.

Request working sample.

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Developers and Producers of Cotton Fillers for Plastics

VULCANIZED VEGETABLE OILS

—RUBBER SUBSTITUTES—

Types, grades and blends for every purpose, wherever Vulcanized Vegetable Oils can be used in production of Rubber Goods—be they Synthetic, Natural, or Reclaimed.

A LONG ESTABLISHED AND PROVEN PRODUCT

THE CARTER BELL MFG. CO.
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1903
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SYNTHETIC RUBBER
★
PLASTICS

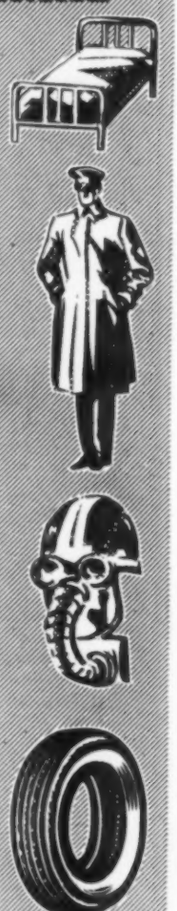
THE Schuster
MAGNETIC CALENDER GAUGE
SAVES THAT MATERIAL

For upwards of 15 years, the Schuster Magnetic Calender Gauge has unerringly set rubber calender rolls to a predetermined thickness and correctly maintained that thickness. It has saved the time of hand-miking, eliminated human error, saved the stock sampled for calender tests, and assured uniform thickness in the finished product.

All this, *at the right time—before* damage is done. And *continuously*—the only way worth while.

The instrument is simple in design . . . rugged in construction . . . practically without wearing parts . . . adjustable to any thickness. Originally used for rubber, it has taken over just as deftly for synthetic rubber, plastics, cellulose, and other media. No matter what the article, your coating must be thick enough, but not even 1/1000" too thick, or the war effort suffers irreparable loss. No matter what the material, you've got to s-t-r-e-t-c-h it as far as possible—and "possible" daily proves to have a new, elastic meaning.

Better investigate the Schuster Magnetic Calender Gauge at once, with or without automatic control. Every installation has to be engineered to the job . . . Please *give us time to do it right.*



Ask for our bulletin on the Schuster Magnetic Gauge.

THE MAGNETIC GAUGE COMPANY
60 EAST BARTGES STREET AKRON, OHIO
Eastern States Representative—
BLACK ROCK MANUFACTURING CO., Bridgeport, Conn.

REVIEWS (CONT'D)

Marmix: Reinforcer for Synthetic Rubber Latices. Marbon Corporation, 1926 West 10th Ave., Gary, Indiana. 8½ x 11 in. 13 pp.

This technical report is devoted to the use of Marmix (Marbon S Resin in a water dispersion) as a reinforcer for synthetic rubber latices. Data is given on the stability and compounding of the reinforcing agent, as well as on the Fade-O-Meter aging of films. A number of formulas containing varying amounts of Marmix in GR-S Type 3 and Hycar OR-15 latex stocks are presented, with physical test results given for each compound. Samples of 10 films from various compounds accompany the report.

•

Patents and Your Tomorrow. National Association of Manufacturers, 14 West 49th St., New York 20, N. Y. 6 x 8½ in. 24 pp.

The importance of patents to science and invention, and to technological progress in general, is emphasized in this booklet, which also includes a comprehensive quiz on patents answering questions on the various aspects and accomplishments of the patent system. Definitions are given of such terms as cross-licensing, restrictive licensing, cartels, compulsory licensing, and exchange of patents, with industry's position indicated on each subject.

•

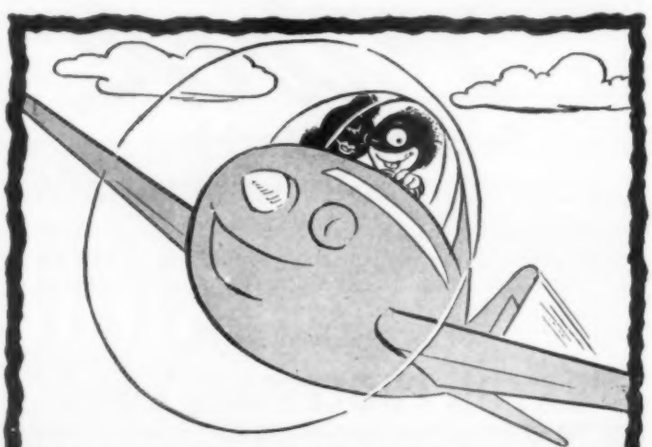
X-Ray Diffraction. North American Philips Co., 100 E. 42nd St., New York 17, N. Y. 8½ x 11 in. 16 pp.

This illustrated booklet covers the basic theory, principles and applications of X-ray diffraction. Topics discussed include how X-rays are diffracted, technique of powder identification, how various types of film-type equipment work, advantages of the new Geiger-counter X-ray spectrometer, low-angle scattering, particle size and orientation of matter, alloy formation, organic compounds, catalysts, studies of mineral substances, high polymer work, petroleum products, and heat exchanger problems.

•

Petrolatum for the Rubber Industry. L. Sonneborn Sons, Inc., 88 Lexington Ave., New York 16, N. Y. 9 x 12 in.

This is a technical data file, for which laboratory data will be furnished from time to time, providing some general information on the uses of petrolatum for facilitating and expediting rubber manufacturing processes. Some data on the front of the file covers rubber processing in general and the function of petrolatum in particular, the properties of Yellow Protopet No. 2 being given in some detail. Specific uses to which petrolatum has been put in the rubber field are also listed on the cover.



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(FOR FURTHER DETAILS, SEE AD ON PAGE 272)

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- All types of Rubber Machinery and Plant Equipment for every requirement of Large and Small Factories.
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MOLD LUBRICANT

This is what it does:
—Gives lustre to finished parts;
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RUBBER-SOL

A new easy and faster method for salvaging metal parts from rubber. Ideal for both aluminum and steel molds. Send us a sample of your salvaged parts for inspection. RUBBER-SOL has many other uses too!

Send Us Your Problems

PREVENTIVE MAINTENANCE CO.

1997 Fairfield Ave., Bridgeport 5, Conn.

Test RUBBER PRODUCTS

—for WEATHERING and FADING with ATLAS-OMETERS

Twin-Arc WEATHER - OMETER

Tests Results Twice As Fast

The new Atlas Twin-Arc Weather-Ometer has been developed to save time where speed in testing is essential.

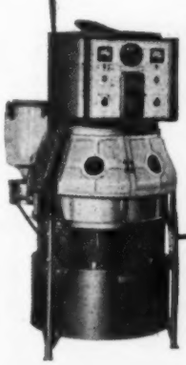
Where Federal Specifications call for a definite number of testing hours in the Atlas single arc Weather-Ometer, this time can be cut in half in the Atlas Twin-Arc.

Exclusive Atlas Twin-Arc Weather-Ometer features:

1. Temperature control.
2. Unlimited range and control of Light and Water Spray Periods.
3. Adjustable and automatic timing.
4. Insulated test chamber.
5. Operates continuously 24 hours without manual attention.
6. Carbon cost 28c per day.
7. Full automatic—Safe to operate unattended overnight.
8. Control panel contains Volt and Ammeters — Time Meter—Light and Water Cycle switch—Automatic time cut off switch — Voltage adjusting switch — Direct reading thermal regulator — Reactance Coil (cut power cost in half).

The Single Arc Model is a popular machine where high speed is not required.

FADE-OMETER



The recognized standard machine of the textile trade for determining the light-fastness of materials. Specimens are rotated around the Atlas Enclosed Violet Carbon Arc—the closest approach to natural sunlight. Temperature of the filtered air is automatically controlled. Proper humidity is furnished by evaporation from a constant-level water reservoir. Available with a wide variety of specimen holders and exposure masks.

• Originators and sole manufacturers of accelerated testing devices for a quarter of a century. Fade-Ometer, Weather-Ometer, Launder-Ometer are used all over the world as accepted standard testing machines.

ATLAS ELECTRIC DEVICES CO.

361 West Superior Street, Chicago 10, Illinois

MARKETS

Rubber – Crude, Reclaimed and Scrap – Cotton – Ducks – Tire Fabrics – Sheetings

NEW YORK DEC. 13, 1945

Natural Rubber

IT is now fairly evident that despite the availability of rubber in the Far East, now estimated at some 300,000 tons ready for immediate shipment, no large quantities can be expected until the political disturbances in the Netherlands East Indies are settled or brought under control and large labor forces are recruited for work in Malaya. Some 50,000 plantation workers are needed in the latter area. In addition, a great need is reported for equipment, food and incentive goods for native rubber workers. Transportation facilities, too, continue to represent a serious problem.

One result of the unsettled conditions in the Far East is expected to be continued high production of synthetic rubber which will be required to meet the long pent-up demand for tires and other products. A conclusion drawn from the recent meeting of the International Study Group on Rubber at London is that although there will undoubtedly be a large surplus rubber capacity within the next two or three years, the cost trend will be progressively downward for both natural and synthetic rubber to the point where world rubber demand will accelerate quickly. Lower prices are also expected to produce new uses.

An interesting report was issued by the U. S. Bureau of Foreign & Domestic Commerce recently indicating that Latin American countries supplied the United States with 92,000 tons of natural rubber during the wartime period. This was 17½% of total rubber imports of 526,311 tons received from all world sources of supply during the years 1942 to 1944 and the first six months of 1945. Brazil, for example, supplied 41,873,624 pounds of rubber (19,000 long tons) in 1944. Mexico supplied 15,009,056 pounds (6,822 long tons) in the same year.

Prices shown below are ceilings set by the Office of Rubber Reserve, Reconstruction Finance Corporation:

	C	N-C
Plantations—		
Ribbed Smoked Sheets, 1X...	22½	40
Thick Pale Latex Crepe, 1X..	22½	40
Thin Pale Latex Crepe, 1X..	22½	40
Thick Brown Crepe, 1X.....	21⅜	38⅞
Thin Brown Crepe, 1X.....	21⅜	38⅞
Thick Remilled Blankets, #1..	21⅜	38⅞
Rolled Brown or Flat Bark..	18	35½
Smoked Blankets, #1.....	21⅜	38¾
Claro Brand 1XRSS.....	22½	40
Sole Crepe Trimmings.....	22	39½
Sole Crepe	22½	40
Wild—		
Uncut Fines, Crude.....	15	29
Cut Fines, Crude.....	15½	29¾
Cut Fines, Washed & Dried..	22½	40
Upriver Coarse, Crude.....	12¾	26½
Upriver Coarse, Washed & Dried	20¼	37¾
Caucho Ball, Crude	11¾	24¾
Caucho Ball, Washed & Dried	19½	37
Guayule—		
Carload Lots	17⅜	31
Less than Carload Lots	18	31½
Balata—		
Surinam Sheet	42½	42¾
Manaos Block	38¾	38¾
Colombian Block	38¾	38¾
Peruvian Prime	38¾	38¾
Chicken Wire	23¼	23¼
Latex—		
Normal, Tank Car Lots	26	43½
Creamed, Tank Car Lots	26¾	44¼
Centrifuged, Tank Car Lots..	27¾	45¼
Heat-Concentrated, Carload Drums	29½	47

C for Civilian Use; N-C for Non-Civilian Use.

Scrap Rubber

Dealers report that demand for scrap rubber in many respects has hit a new low, although the decline is not attributed to the current automobile strike or to any slackening of demand whatsoever for new tires as replacements. Some dealers report puzzlement over the new trend, especially since demand for reclaim continues at the previous high level. Only scrap auto, truck and bus tires are in good demand at steady prices, with large dealers continuing to pay around $18.50 delivered Akron and a dollar less delivered at eastern consuming points. Beadless tires bring $24.50 Akron and $23.00 in the east. Lack of consumer interest is also reported for synthetic S.A.G. tire scrap, while sellers of miscellaneous scrap lots, including government agencies, can hardly raise a bid. The recent increase granted to splitters has not yet resulted in expected larger quantities of segregated material. Prices shown below are ceilings on typical grades of scrap:

(Prices to Consumers, Delivered Akron)

Mixed passenger tires .....ton	$20.00	
Beadless truck tires.....ton	26.00	
Mixed truck tires.....ton	20.00	
Beadless passenger tires.....ton	26.00	
No. 1 passenger peelings.....ton	52.25	
No. 1 truck peelings.....ton	52.25	
No. 2 passenger tubes.....lb.	.07¾	
Red passenger tubes.....lb.	.07½	
Black passenger tubes.....lb.	.06¾	
Mixed passenger tubes.....lb.	.06½	
No. 2 truck tubes.....lb.	.07½	
Red truck tubes.....lb.	.07¼	
Black truck tubes.....lb.	.06½	
Buffings .....ton	35.00	
Bicycle tires .....ton	15.00	
Air bags and water bags.....ton	15.00	
Boots and shoes.....ton	33.00	

Tire Fabrics

The situation in the tire fabric field remains unchanged, with practically no demand for such fabrics. Consequently, prices are nominal and in many quarters are not even being quoted. The prices shown below are those which were in force on or about January 15, 1942.

(Prices Net at the Mill)

Peeler, carded, 23/5/3.....lb.	.43½ @	.44
Peeler, carded, 23/4/3.....lb.	.44½ @	.45
Peeler, carded, 15/3/3.....lb.	.41½ @	.42
Peeler, carded, 15/4/2.....lb.	.41½ @	.42
Peeler, carded, 13/3/3 ..lb.	.40½ @	.41
CHAFERS		
Carded, American, 1 1/16".....lb.	.43½ @	.44
Carded, American, 1".....lb.	.39½ @	.48

Sheetings

48x40	36	in.	5.50	.....lb.	—	@ 8.272
40x40	36	in.	6.15	.....lb.	—	@ 7.398
40x36	36	in.	6.50	.....lb.	—	@ 7.000
48x48	40	in.	2.50	.....lb.	—	@17.200
48x48	40	in.	2.85	.....lb.	—	@15.087
56x60	40	in.	3.60	.....lb.	—	@12.638
48x44	40	in.	3.75	.....lb.	—	@11.733

Note: Prices shown above are ceiling prices set by order of the O.P.A

Cotton

The price of middling uplands on the Cotton Exchange has swung in the range of 57 points since our last report (November 19), high for the period being 25.26 on December 12 and low 24.69 on November 24. The average price for middling uplands for the month of November was 24.71, based on 24 trading days. The trend has been upward throughout the period, the price passing the 25-cent mark on December 3, a new seasonal high. The upward swing, which is expected to continue, is attributed largely to the growing conviction that the 1945 cotton crop will be considerably smaller than originally forecast plus favorable developments for resumption of exports. The Department of Agriculture has estimated world cotton production in 1945-46 at 22,650,000 bales of 478 pounds net, which is the smallest indicated world crop since 1923-24 and represents a drop of 7% compared with the 24,470,000 bales produced in the previous season and 27% less than the 1935-39 average of nearly 31,000,000 bales. A cotton industry export advisory board has been appointed to help solve a perplexing problem, namely, the disposal of approximately 2,500,000 bales of government-owned cotton. It is hoped that the board will find ways and means to rid the country of much of its surplus cotton and thus pave the way for an eventual return to production based on regular supply and demand. Quotations for middling uplands on the Exchange follow:

	Nov. 19	Dec. 13		
	Close	High	Low	Close
December	24.15	24.80	24.64	24.66
March	24.10	24.75	24.65	24.65
May	24.03	24.65	24.55	24.55

Reclaimed Rubber

Demand for reclaim still continues strong, emanating from practically all branches of the industry. Despite the automobile strike demand from the tire manufacturers remains high with all factories striving to achieve maximum production to secure mass distribution as quickly as possible and thus secure an invaluable sales lead. Uniform ceiling prices have been established by OPA for sales of two types of rubber made from gas mask scrap and reclaimed for the government, the ceilings being 10 cents a pound for rubber without carbon black and 6 cents a pound with carbon black content. The same ceilings apply on sales by government agencies to any buyers or by resellers to industrial consumers. Previously there was only one 10 cent ceiling which applied to sales of rubber without carbon black by the Rubber Reserve Co. Reclaim of this type is mainly used for heels and soles. Prices shown below are ceilings on typical grades of reclaim:

Shoe			
Unwashed .....lb.	.07½ @	.07¾
Tube			
Black Tube .....lb.	.11¾ @	.12
Red Tube .....lb.	.12½ @	.12¾
Tires			
Black (acid process) .....lb.	.08 @	.08¼
Black, selected tires .....lb.	.07 @	.07¼
Truck, Heavy Gravity....lb.	.09 @	.09¼
Miscellaneous			
Mechanical blends .....lb.	.05 @	.06
White .....lb.	.13½ @	.13¾

Ducks

Enameling (single filling)....lb.	— @	.44¾
Belting and Hose.....lb.	— @	.39
Single filling, A grade.....lb.	— @	.19¾
Double filling, A grade.....lb.	— @	.20¾

Plan NOW to Speed Up Production

New Laboratory Mills

Two Sizes
6" x 12"
6" x 16"

IF your post war plans for greater production call for special Rubber machinery, we invite you to submit them to Thropp Engineers NOW. They will gladly work with you in designing custom built mills for your particular requirements to enable you to convert quickly to peace time production. Write NOW!

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A HIGH QUALITY CONCENTRATED LIQUID MOLD AND MANDREL LUBRICANT—*NON-TOXIC, NON-TACKY, ODORLESS.*

- *Simplifies the removal of cured rubber from the molds.*
- *Results in a transparent satin-like finish.*
- *Does not build up on the molds.*
- *Extremely concentrated and low in cost.*

A Direct Source for Zinc and other Metallic Stearates.

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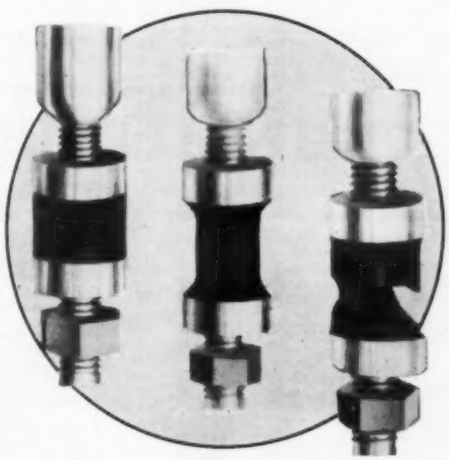
Eliminate
BRASS PLATING *use*
REANITE
TO BOND RUBBER AND SYNTHETIC RUBBER TO METALS

With Reanite you can forget slow, costly brass plating in rubber-to-metal adhesion. Merely substitute two quick-drying coats of Reanite cement for the brass plating operation and proceed as usual. Follow your standard practice for curing time, pressure and temperature. *Reanite bonds will prove stronger than the rubber itself!*

Reanite will bond natural rubber or Buna S with practically integral adhesion to steel, aluminum, magnesium, copper, in fact almost any metal.



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Dept. RA, Box 350 • Akron 9, Ohio

Please send me full information, without obligation, on the Reanite Process for bonding rubber-to-metal.

Name_____
Title_____
Company_____
Address_____

U. S. STONEWARE

Since 1865 • Akron, Ohio

CHEMICAL MARKETS

New York, Dec. 13, 1945
All Prices F.O.B. Works

ACCELERATORS

Organic			
A-1 (Thiocarbanilid)	lb.	.28	.33
A-10	lb.	.36	.42
A-19	lb.	.52	.58
A-32	lb.	.59	.69
A-77	lb.	.42	.55
A-100	lb.	.42	.55
Aldehyde ammonia, crystals	lb.	.65	.70
Altax	lb.	.39	.41
Beutene	lb.	.59	.64
B-J-F	lb.	.34	.39
Butasan	lb.	—	@ 1.10
Butyl Zimate	lb.	—	@ 1.10
Captax	lb.	.34	@ .36
Crylene	lb.	.40	.47
Di-Ortho-Tolyguanidine	lb.	.44	.46
Diphenylguanidine	lb.	.35	@ .41
El-Sixty	lb.	.36	@ .43
Ethasan	lb.	—	@ 1.10
Ethyl Tuads	lb.	—	@ 1.25
Ethyl Zimate	lb.	—	@ 1.10
Ethylidine aniline	lb.	.42	.43
Formaldehyde aniline	lb.	.31	—
Guantal	lb.	.39	.48
Hepteen	lb.	.34	.39
Hexamethylenetetramine	lb.	.33	—
Lead Oleate, No. 999	lb.	.13	—
Witco	lb.	.15	—
Ledate	lb.	—	@ 1.20
Methasan	lb.	—	@ 1.20
Methyl Tuads	lb.	—	@ 1.25
Methyl Zimate	lb.	—	@ 1.20
Monex	lb.	—	@ 1.25
Pentex	lb.	.74	.84
Phenex	lb.	.49	@ .54
Pip-Pip	lb.	—	@ 1.63
R & H 50-D	lb.	.42	@ .43
R-2 Crystals	lb.	—	@ 1.55
Rotax	lb.	.44	.46
Safex	lb.	1.15	@ 1.25
Santocure	lb.	.60	.67
Selenac	lb.	—	@ 1.60
SPDX-G	lb.	.53	@ .58
Super-Sulfur No. 2	lb.	.13	.15
Thiocarbanilid, drums	lb.	.28	.33
Thiofide	lb.	.39	@ .46
Thiotax	lb.	.34	@ .41
Thiurad	lb.	—	@ 1.25
Trimene	lb.	.54	.64
base	lb.	1.03	@ 1.18
Triphenylguanidine	lb.	.45	—
Ulto	lb.	.99	@ 1.04
Ureka	lb.	.50	.57
Blend B	lb.	.50	.57
Blend C	lb.	.48	.55
Vulcanex	lb.	.42	.43
Vulcanol	lb.	.85	—
Inorganic			
Litharge, domestic	lb.	.07	.07½
Magnesia, calcined, heavy	lb.	.04	—

COLORS

Blues [b]			
Prussian	lb.	.36	—
Ultramarine	lb.	.17	.27
Browns [b]			
Mapico	lb.	.1135	—
Umber, Turkey	lb.	.04¼	—
Greens [b]			
Chrome	lb.	.23	—
Guignet's Green	lb.	.70	—
Reds			
Antimony crimson, 15/17	lb.	—	—
Indian	lb.	.08¼	—
Domestic (Maroon)	lb.	.11	—
Mapico	lb.	.096	—
Red oxide, pure	lb.	.10	.12
Rub-Er-Red	lb.	.09¼	—
Whites [b]			
Cryptone No. 19	lb.	.0560	.0585
Cryptone CB No. 21	lb.	.0560	.0585
Cryptone ZS-800	lb.	.0825	.0850
Lithopone:			
Albalith	lb.	.04½	.04½
Astrolith	lb.	.04½	.04½
Axolith	lb.	.04½	.04½
Ray-cal	lb.	.05½	.05¾
Rayox	lb.	.14½	.15¼
Titanox A	lb.	.14½	.14¾
Titanox B	lb.	.05¾	.06
Titanox C	lb.	.05½	.05¾
Zinc Oxide—American Process [b]			
American Azo:			
ZZZ (lead free)	lb.	.07¼	.07½
Anaconda, lead free	lb.	.07¼	.07½
Horsehead Lead Free Brand:			
Special—3	lb.	.07¼	.07½
XX Red—4	lb.	.07¼	.07½
Kadox, black label—15	lb.	.07¼	.07½
Red label—17	lb.	.07¼	.07½
72	lb.	.07¼ @	.07½
St. Joe, black label	lb.	.07¼	.07½
green label	lb.	.07¼	.07½
red label	lb.	.07¼	.07½
U. S. P.—7, bbls.	lb.	.10½	.10¾
Zinc Oxide—French Process: [b]			
Florence White Seal—7 bbl.	lb.	.09½	.09¾
Green seal—8	lb.	.09	.09¼
Red seal—9	lb.	.08½	.08¾
Yellows [b]			
Cadmolith	lb.	.55	.60
Chrome	lb.	—	.50
Mapico	lb.	.071	—

[a] Price Ceilings.
[b] Price Suggestions or Agreements.

BLACKS
(In bags, carload lots)

Arrow Compact	.0355@	—
Atlantic	.0355@	—
Certified	.0355@	—
Certified Spheron	.0355@	—
Continental	.0355@	—
Disperso	.0355@	—
Dixiedensed	.0355@	—
Dixiedensed 66	.0355@	—
Excello	.0355@	—
Furnex	.03½@	.06
Furnex Beads	.03½@	.06
Gastex	.03½@	.06
Kosmobile	.0355@	—
Kosmobile 66	.0355@	—
Kosmos-Dixie 20	.03½@	.06
Micronex (Amarillo)	.0355@	—
Micronex Beads (Amarillo)	.0355@	—
Pelletex	.03½@	.06
P-33	.04 @	.06½
Philblack A	.05 @	—
Shell Carbon (Del. Midwest)	.0240@	—
Sterling	.035 @	—
Supreme	.0355@	—
Thermax	.0225@	.03
Wyex	.0355@	—

COMPOUNDING MATERIALS

Aluminum Flake	ton	18.00	24.50
99½%-300	ton	—	16.50
86-90%-300	ton	—	13.50
Asbestine	ton	16.50	20.00
Atomite	ton	—	27.50
Barium carbonate (98-100%)	ton	47.00	49.00
Barytes	ton	25.35	36.00
Bentonite	ton	11.00	16.00
Blanc fixe, dry	ton	60.00	@67.00
Calcene	ton	37.50	43.00
Catalpo (fact)	lb.	.02	—
Clay, Aerfloted, Suprex	ton	11.00	@23.50
Aerfloted Paragon	ton	10.00	22.50
Champion	ton	—	@11.00
Crown	ton	—	11.00
Dixie	ton	11.00	@23.50
Kaolloid	ton	—	9.00
Langford	ton	—	8.50
Magnolia	ton	—	@10.00
McNamee	ton	10.00	@22.50
Par	ton	—	@11.00
Witco	ton	10.00	—
Kalite No. 1	ton	26.00	@52.00
Kalvan	ton	100.00	@126.00
Keystone white	ton	—	@14.00
Magnesium carbonate	lb.	.06¼	—
Mineralite	ton	—	@30.00
Pyrax A	ton	—	@ 8.40
Rottenstone (powd. Dom.)	ton	25.50	@37.50
Rubberol	lb.	—	.17½
Silene EF (calcium silicate)	lb.	.055	.06
Silical	ton	65.00	@85.00
Snowflake white	ton	—	@16.00
Talc, domestic	ton	14.50	@ —
Whiting, commercial	ton	16.00	@26.00
Witco	ton	—	@ 6.50
Witcarb R	ton	—	@100.00
Witcarb R-12	ton	—	@40.00
Wood Flour (100 mesh)	ton	30.00	@32.00

MINERAL RUBBER

285°-300° Mineral Rubber	ton	25.00	@27.00
Black Diamond	ton	25.00	—
Dielex	lb.	—	@ .06
Hard Hydrocarbon	ton	25.00	@27.00
MilliMar	lb.	—	.05½

MISCELLANEOUS

Aromatics—Rodo #0	lb.	4.00	@ 4.50
Rodo #10	lb.	5.00	@ 5.50
Curodex 19	lb.	2.75	—
Curodex 188	lb.	3.50	—
Curodex 198	lb.	4.50	—
Para-Dora	lb.	4.50	—
Areaklene No. 375	lb.	.35	.50
Darvan (dispersing agent)	lb.	.30	.39
Santomerse S	lb.	.11	.25
Sponge Paste	lb.	—	.18
Sunproof	lb.	.22¾	.27¾
Tonox	lb.	.50	.59
Ty-Ply	gal.	6.75	@ 8.75
Unicel (blowing agent)	lb.	.50	—

SOFTENERS

Acids			
Acetic, 28%, bbls. [a]	100 lb.	3.38	3.63
Nitric, 36 degrees	cwt.	5.00	—
Acids, Fatty			
Laurex	lb.	.14¾	.17¼
SL-20	lb.	.11	@ .13
Stearex Beads	lb.	.10	@ .11
Stearite	lb.	.10	@ —
Alkalies			
Caustic Soda, 76%	cwt.	2.70	5.70
Soda Ash, 58%	cwt.	1.15	2.95
Oils			
Degras, bbls. [a]	lb.	.10	@ .12
Para-Flux	gal.	.17	.18
Para-Lube	lb.	.046	.048
Petrolatum, amber	lb.	.03¼	@ —
Pigmentaroil, tank cars	gal.	.20½	@ —
in drums	gal.	.26½	.27½
Pine, tanks [a]	gal.	.55	@ —
Rosin Oil, cmpd.	gal.	.40	—
Rubberol	lb.	.13½	.14
Rubtack	lb.	.10	—
Seedine, c.l.	lb.	.07¼	—
Witco Palm Oil	lb.	—	—
Witco Softener No. 20	gal.	.20	—
Woburn No. 8, c.l.	lb.	.06	—
Resins and Pitches			
Pitch, Burgundy	lb.	.08	@ —
coal tar	ton	19.00	22.00
hardwood	ton	16.00	@22.50
pine, 200 lb. gr. wt.	bbl.	—	@ 4.50
Pigmentar, tank cars	gal.	.20½	—
in drums	gal.	.26½	.27½
Retort Pine Tar, drums	gal.	.26½	.27½
Solvents			
Acetone, pure [a]	lb.	.07	—
Benzene, 90%, tank car	gal.	.14	—
Beta-Trichlorethane	gal.	—	.20
Bondogen	lb.	.98	@ 1.25
Carbon, bisulfide	lb.	05	.08¼
Carbon tetrachloride	gal.	.73	@ 1.27
Dichlorethylene	lb.	—	—
Dipentene, cml., drums	gal.	.48	.50
Ethylene dichloride	lb.	.07½	.08¼
Plastogen	lb.	.07¾	@ .12
Reogen (drums)	lb.	.11½	@ .13
Rub-Sol	gal.	.09½	—
Trichlorethylene	lb.	.08	.09¼
Turpentine, steam dist., drums	gal.	.80	.83
Waxes			
Antisol	lb.	.22½	.23½
Beeswax, white [a]	lb.	.58	@ —
Carnauba, yellow [a]	lb.	.83¼	—
Ceresin, white, dom.	lb.	.13½	.15
Montan, dom.	lb.	.30	@ .35
Paraffin [a]			
Yellow crude scale, 124/126	lb.	.04½	—
Refined, 120/122	lb.	.05¼	—

ANTI-OXIDANTS

Agerite Alba	lb.	1.95	2.03
Gel	lb.	.52	.54
Hipar	lb.	.61	.63
Powder	lb.	.40	.42
Resin	lb.	.43	.45
Resin D	lb.	.40	.42
White	lb.	1.23	1.33
Albasan	lb.	.69	.74
Antox	lb.	.54	.56
B-L-E	lb.	.40	.49
Flectol H	lb.	.40	.47
Neozone A, C, D, E	lb.	.40	.63
Oxynone	lb.	.77	.90
Retardex	lb.	.44½	.47¼
Santoflex B	lb.	.40	.47
Santoflex BX	lb.	.54	.61
Santovar O	lb.	1.15	1.40
S.C.R.	lb.	.32	.34
Stabilite	lb.	.48	.50
Stabilite Alba	lb.	.69	.74
VGB	lb.	.43	.52

EXTENDERS

Naftolen R-100	lb.	.10	.12

LUBRICANTS—MOLD & RUBBER SURFACE

Areaklene	lb.	.35	.50
Cocoa Soapstock	lb.	.06	.08
Colite	gal.	.90	1.15
Dipex	lb.	.06	.08
Glycerized Liquid Lubricant	gal.	—	1.35
Lubrex	lb.	.25	.30
Mineralite	ton	—	@30.00
Sericite	ton	65.00	@75.00
Soap Tree Bark, cut, sifted	lb.	.06	.08

FACTICE OR RUBBER SUBSTITUTES

Amberex	lb.	.25	—
Amberex Type B	lb.	.18¾	—
Black	lb.	.08½	.13
White	lb.	.09	.15
Brown	lb.	.10	.14
Neophax A	lb.	.16½	—

VULCANIZING INGREDIENTS

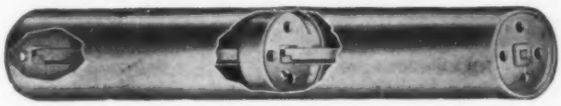
Dispersed Sulfur No. 2	lb.	.08	.12
Sulfur Chloride, yellow (drs.)	lb.	.03	@ .08½
Sulfur, rubber makers			
Refined (bags)	cwt.	2.55	—
Commercial (bags)	cwt.	2.20	—
Telloy	lb.	1.75	—
Vandex	lb.	1.75	—
Vultac No. 1	lb.	.38	@ .43
Vultac No. 2	lb.	.38	@ .45
Vultac No. 3	lb.	.42	@ .49

New and Better

GAMMETER'S

ALL STEEL **ALL WELDED**

CALENDER STOCK SHELL



4" - 5" - 6" - 8" - 10" - 12" diameters, any length.

Besides our well known Standard and Heavy Duty Constructions, we can supply light weight drums made up to suit your needs.

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GUAYULE RUBBER

Washed — AMPAR BRAND — Dried

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CONTINENTAL RUBBER COMPANY OF NEW YORK
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OXIDES AND CARBONATES LIGHT AND HEAVY • FOR TECHNICAL & DRUG USES

THE PHILIP CAREY MFG. COMPANY

BRANCHES IN ALL PRINCIPAL CITIES

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Wm. S. GRAY & CO. DISTRIBUTORS NEW YORK CITY

COLORS for RUBBER

Red Iron Oxides
Green Chromium Oxides
Green Chromium Hydroxides

•

Reinforcing Fillers and Inerts

C. K. WILLIAMS & CO.
EASTON, PA.

SOFTENERS and PLASTICIZERS
For RUBBER
From the Pine Tree

ROSIN OIL
PINE TAR
BURGUNDY PITCH
GALEX a non-oxidizing RESIN
Send for "Pine Tree Products" *Booklet*

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R. K. O. BUILDING, RADIO CITY, NEW YORK, N. Y.
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"PIONEERS OF THE INDUSTRY"

Let us estimate on your

CUTTING DIES

• Years of experience making dies of all kinds for rubber manufacturers enable us to offer you correctly designed dies of tempered steel which retain their cutting edges....*Send blue print for quotation.*

BROCKTON CUTTING DIE & MACHINE CO. INC.
CUTTING AND PERFORATING DIES

AVON, MASS.

METALLURGICAL SERVICE CO.

PROCESS ENGINEERS — COMMERCIAL CO. HEAT TREATERS — INDIANAPOLIS 2, INDIANA

RUBBER DENUDING

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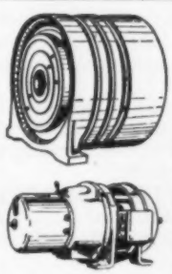

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ORGANIC CHEMIST: Synthetic rubber manufacturing plant located in midwest needs organic chemist to assist in supervision of laboratory work on production control and development of new polymer types. M.S. degree and experience with synthetic polymers desirable although not essential provided sufficient experience in organic development work can be shown. Salary in line with experience and training. Write giving complete data. Address Box 2026, RUBBER AGE.

CHEMIST or CHEMICAL ENGINEER—age 25 to 30—some experience in rubber compounding for experimental work in developing new formulas and processes. Good working conditions, excellent opportunity. Write Personnel Department, BRUNSWICK-BALKE-COLLANDER CO., Muskegon, Mich.

CHEMICAL ENGINEER—recent college graduate for varied experimental work in rubber, plastics and wood finishes. Good working conditions, excellent opportunity. Write Personnel Department, BRUNSWICK-BALKE-COLLENDER Co., Muskegon, Mich.

TIRE FINISHING SUPERVISOR—Opening for man with experience in supervising duties connected with cured tire final finishing. Position offers excellent opportunity for advancement. All replies confidential. Address Box 1890, RUBBER AGE.

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WANTED: Complete mechanical rubber goods plant equipment, including mills, calender, presses, pumps, Banbury mixer, hose machine, belt press, extruding machine, etc. Send complete description, location and price. Address Box 2005 RUBBER AGE.

WANTED: One 22 x 22 x 60" rubber mill with drive, motor and controls for 60 cycle 3 phase 440 V. current. Apron belt attachment for same also desirable. Please state price, location, and complete description. Address Box 2029, RUBBER AGE.

WANTED: One flying shear with or without electric motor, motor controls and drive and with or without conveyor belt. Please state price, location, and complete description. Address Box 2030, RUBBER AGE.

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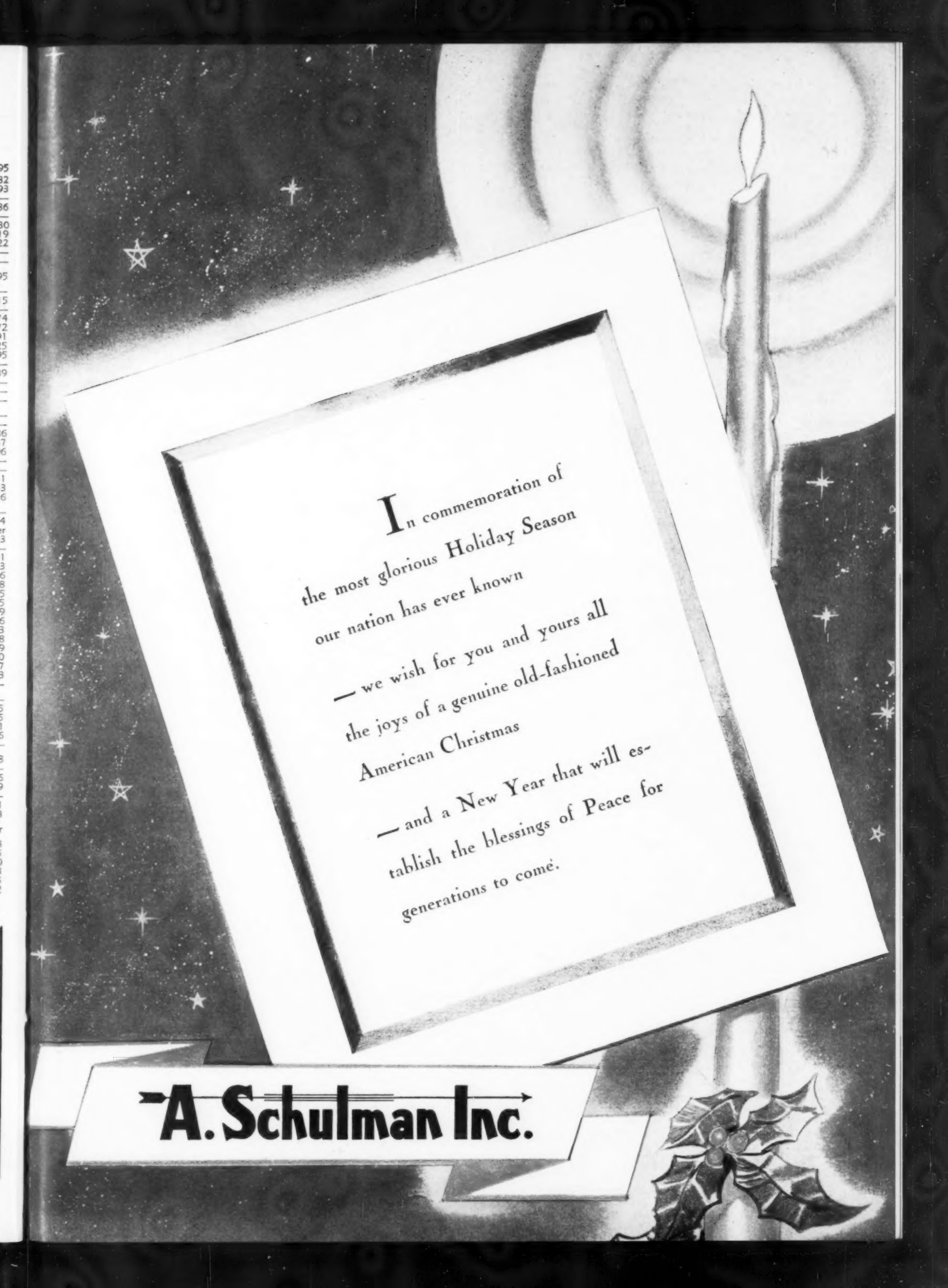
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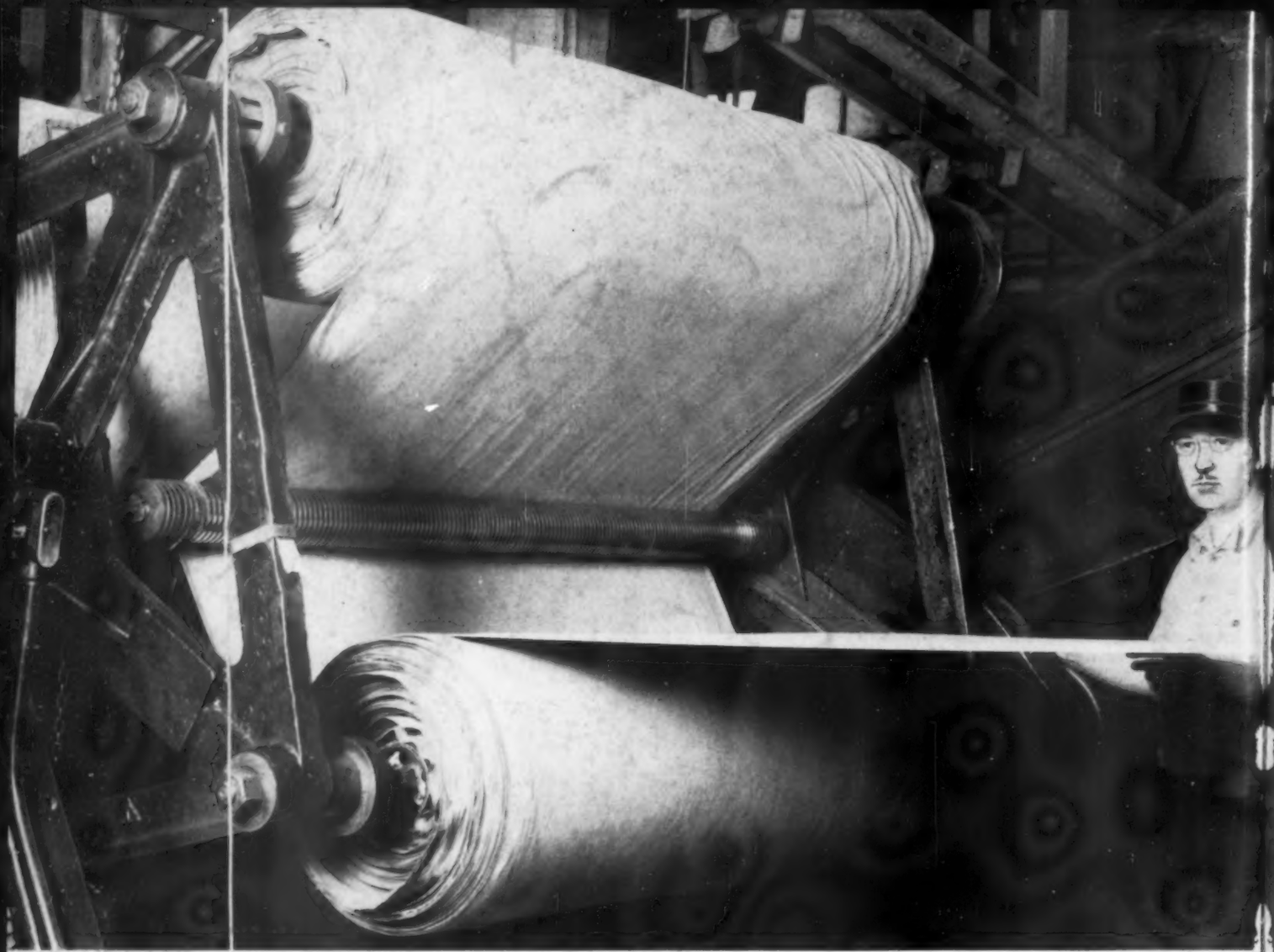

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